EXPERT ADVICE AND TIPS FOR EVERY AMIGA ENTHUSIAST

WIN! MORPH PLUS

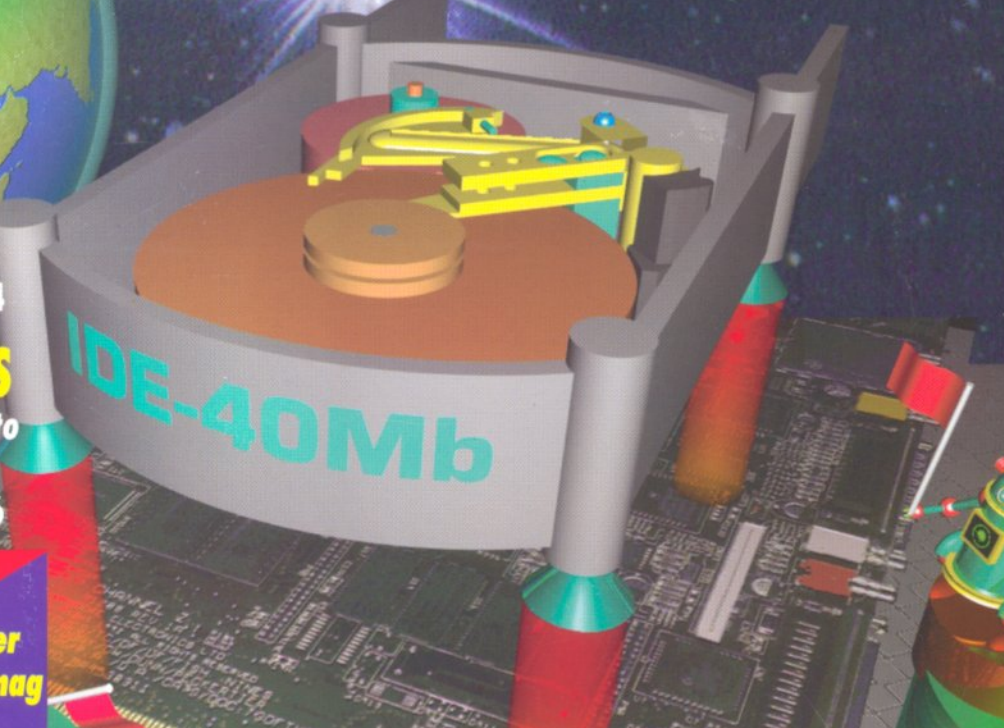
AMIGA SHOPPER

From the makers of AMIGA FORMAT

ISSUE 23 • MARCH 1993 • £2.25

YOUR DEFINITIVE AMIGA GUIDE

Hard hearted



INSIDE

• SELF ASSEMBLY!

Get started in assembly language PLUS complete listing and assembler on disk

Assembler: page 24

• DIY HARDWARE REPAIRS

Amiga not working? We show you how to fix the most common faults yourself

DIY Repairs: page 56

SPECIAL DISK ISSUE

Seven utilities, an assembler and linker package and all the source code in the mag

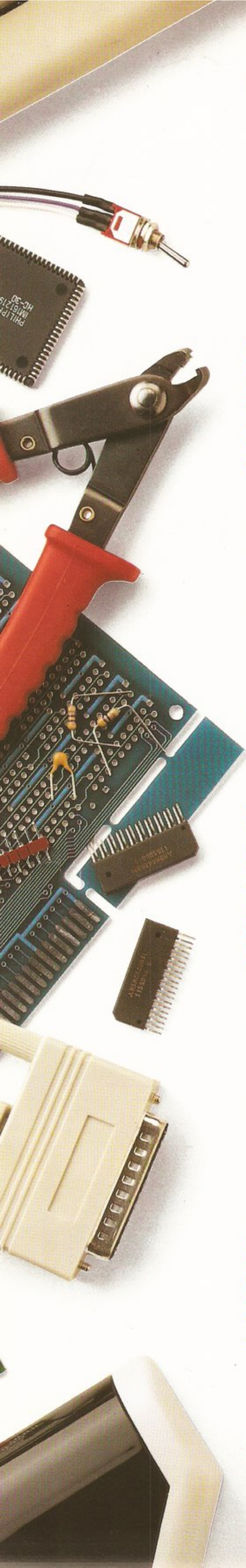
Fit an internal hard drive to your A600 or A1200 - step-by-step instructions start on p14

What! Your cover disk has disappeared down a black hole? Better ask your newsagent for another

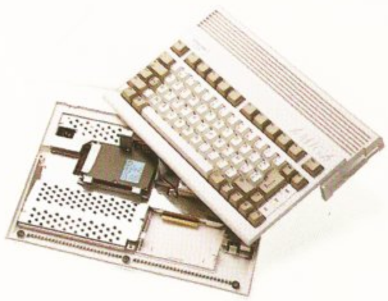
AMIGA ANSWERS

Let our experts solve your Amiga problems. Whether your hassle is with hardware or software, turn to page 33 for the answers

Future PUBLISHING
Your guarantee of value



Amiga 600



- The compact Amiga
- 1MB of RAM
- Built-in TV modulator
- IDE Hard disk controller built-in
- PCMCIA Card slot
- Includes Power Mouse Mat
- Includes Apache joystick

Amiga 600 .... **£285**
Amiga 600 & 40MB HD **£455**
Amiga 600 & 60MB HD **£499**
Amiga 600 & 80MB HD **£549**

Amiga 1200



- 32-bit computer
- 68020 microprocessor
- Optional 68881/68882 floating point unit
- 2MB RAM
- PCMCIA Card slot
- 16.8 million colour palette
- Displays up to 256,000 colours on screen
- Includes Power Mouse Mat
- Includes Apache joystick

Amiga 1200 .... **£390**
Amiga 1200 & 40MB HD **£560**
Amiga 1200 & 60MB HD **£604**
Amiga 1200 & 80MB HD **£654**

Internal Hard Drive

40MB Internal hard disk **£199**
80MB Internal hard disk **£269**

Blizzard Turbo

- A500/A500+
- Expand up to 8MB (0K installed)
- Memory and 68000 CPU run at 14.28MHz
- Fast 68000 processor installed on-board
- Fully auto-configuring
- Optical 512K shadow RAM on extra memory bank for shadowing the operating system out of ROM or from disk

Blizzard Turbo **£129**
Blizzard Turbo 2MB RAM **£185**
B'Turbo 2MB RAM + 256K Shadow RAM **£199**

Amiga 4000

- 32-bit computer
- 68040 microprocessor
- 25MHz clock speed
- 2MB 32-bit chip RAM
- Built-in 3.5" high density disk drive
- 16.8 million colour palette
- Display up to 256,000 colours on screen
- High resolution graphics
- AGA Custom chip set
- VGA or multiscan monitors
- AmigaDOS 3.0 & CrossDOS

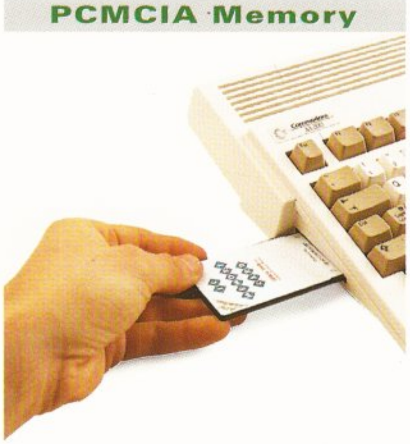
Amiga 4000 & 120MB HD **£2329**

A3000

- 68030 microprocessor with coprocessor
- 2MB RAM
- Hi-Res graphics with 1MB graphic RAM
- Built in SCSI interface
- Hard disk as standard
- 'T' is Tower version

Amiga 3000 & 52MB HD **£1439**
Amiga 3000 & 105MB HD **£1569**
Amiga 3000T 100MB HD 5MB RAM . **£2349**
Amiga 3000T 200MB HD 5MB RAM .. **£2936**

PCMCIA Memory



- Ultra slim memory cards
- 1MB & 2MB
- For A600/A1200

1MB Memory card .... **£POA**
2MB Memory card .... **£POA**

Amiga Accessories

A2300 Genlock **£57**
A2065 Ethernet Card **£245**
A2232 Serial Card **£104**
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- Multisync monitor
- For use with Flicker Fixers
- Very high quality

Commodore Trisync monitor **£479**

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48Hr delivery £2.50 24Hr delivery £4.50
Parcel post delivery £1 (U.K mainland only)

Home Music Kit



- The complete music kit for the Amiga

Digital Studio III

- Transform your Amiga into a digital sound studio
- Create your own music
- Re-mix songs
- Piece together various songs

Real Time Sound II

- Add special effects to music
- Over 32 special effects
- Echo effect
- Can work with MIDI instruments
- Each effect can be modified
- Make your voice sound robotic
- Allow your music to sound like it's being played in a concert hall

Stereo Sound Digitiser

- Convert your desired sounds into digital signals

Other Features

- Maximum sampling rate 900 KHz
- Dynamic filtering
- Anti-aliasing filter
- Stereo gain control by software
- Microphone volume scale

Home Music Kit **£49.95**

AMIGA SHOPPER AT A GLANCE GUIDE

To help you find what you want quickly and easily, this is a cross-referenced list of all the products and subjects covered in this month's *Amiga Shopper*. The subjects covered in *Amiga Answers* are detailed on page 33; the many PD programs covered on page 119 are listed there. The page numbers given are for the first page of the article in which the subject is mentioned.

Are there any products or subjects you'd like us to take a look at? Well, just drop a line to:

Amiga Shopper,
30 Monmouth Street,
Bath BA1 2BW.

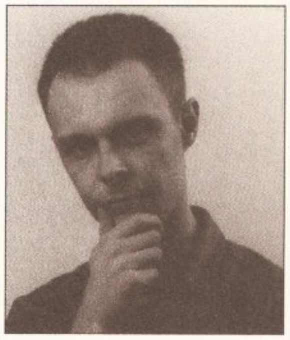
WELCOME

We're always extolling the virtues of hard drives here at *Amiga Shopper*, and with good reason too. Those of you who, like me, can remember using home computers with cassette tape-based storage will also remember the amazing difference that first disk drive made. Believe me, your first hard drive is a similar advance in productivity.

It's all very well for owners of the A500 and A2000, who can buy plenty of drives off the shelf, but finding a drive for an A600 or A1200 is a little more complicated, or has been until now. Starting on page 14 is an article that will put paid to this – it tells you *everything* you need to choose, fit and use an IDE hard drive.

The hardware theme continues with the new series on page 56, *DIY Hardware Repairs*. Let's face it, with your warranty out of date and your machine broken you could be looking at a nasty repair bill. But why pay, when the chances are it's a simple fault that you could easily fix yourself? Go on, take a look...

It's not all about hardware this month, of course. We've finally bowed to public demand and printed an assembly language tutorial. It assumes a basic knowledge of programming, nothing more, and whisks you right along until you're opening libraries and moving sprites. Complementing it is a public domain assembler and linker on the cover disk, along with source code for the examples, naturally. In fact, we've saved you quite a bit of typing this month, since just about every example program appearing in the magazine is also on the disk, and that's not to mention all the lovely, lovely utilities we've crammed on as well.



Enjoy the ish!

Editor

PUBLIC DOMAIN WORLD

A FISTFUL OF FISH

There are thousands of Amiga programs which are available for little more than the price of a disk. And many more which allow you to try the software free before you buy. Each month in Public Domain World we examine the best of these programs and explain how to get hold of them.

We take another trawl through the latest in the Fred Fish collection this month, looking at, among other things, an excellent 3D graphing program. Public Domain World or

For a few fish more

as we call it this month, starts on page 119

AMIGA ANSWERS

8 PAGES DEVOTED EXCLUSIVELY TO ANSWERING YOUR QUESTIONS

Every month in *Amiga Answers* our panel, comprised of experts from each of the fields of Amiga computing, answers more genuine reader questions than any other Amiga magazine. And in the *Code Clinic* any errors in programs you send in will be corrected as well!

We answer questions every month on Workbench • The CLI • Comms • Programming • DTP • Video • Business software • And more!

THE ANSWERS START ON PAGE 33

FOR A FULL LIST OF CONTENTS, TURN THE PAGE


AMIGA A1200 PACKAGE..........£389.00
Our A1200's are also available with fully prepared and formatted internal IDE hard disk drives. Please add the following prices for the size of the disk that you require:-
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85Mb £199.00
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240Mb £449.00
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AMIGA SHOPPER
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Yes, it's another chance to win a year's free subscription. All you have to do is fill in the blank in the following well-known phrase or saying: "Dispatch war-rocket _____ to bring back his body!". If you think you know the answer, or even if you're willing to make a guess, then just jot it down on a card and send it off to: 'Gordon's alive!?', *Amiga Shopper*, 30, Monmouth St, Bath, BA1 2BW. First correct answer out of the bag wins 12 free issues. Oh, and last month's winner was Martin Kerr of Peterlee, Co Durham.

FUTURETECH CONSUMER ELECTRONICS – REPORTS GREATLY EXAGGERATED...

Contrary to a story in the January edition of *Amiga Format* magazine, it appears that Futuretech Consumer Electronics of Newport Pagnell has not gone into liquidation and is trading as normal.

NEW STRUCTURED DRAWING PACKAGE

Soft-Logik has released *Art Expression*, a structured drawing package that looks likely to be in direct competition with Gold Disk's *Pro Draw*.

Art Expression enables the illustrator to produce resolution-independent images with the aid of a host of tools and pre-defined basic shapes. It can also be used to create typographical effects, such as mapping text to curves. File formats which can be read by *Art Expression* include those of *Professional Draw*, *Aegis Draw*, *ProVector* and *Adobe Illustrator*. Illustrations can be saved out as Encapsulated PostScript or IFF DR2D files.

Also included with the package is *BME 1.1*, a bitmap editor, and *Trace*, a program which will convert standard Amiga bitmaps to structured drawings that can be read by *Art Expression*.

The product is distributed in the UK for £144.99 by Micro-PACE ☎ 0753 551 888. Soft-Logik is on ☎ 0101 800 829 8608.

CORRECTION

Last month we inadvertently printed the wrong telephone number for Think Limited. The correct number is ☎ 021 384 4168.

New software arrives to take full advantage of the AGA chip set

A1200 Programs begin to roll

Programs are now beginning to appear that are written specifically with the A1200 and A4000 in mind.

By the time you read this Electronic Arts will have released the latest version of its acclaimed paint program, modified to take advantage of the extra colours available to A1200 and A4000 owners.

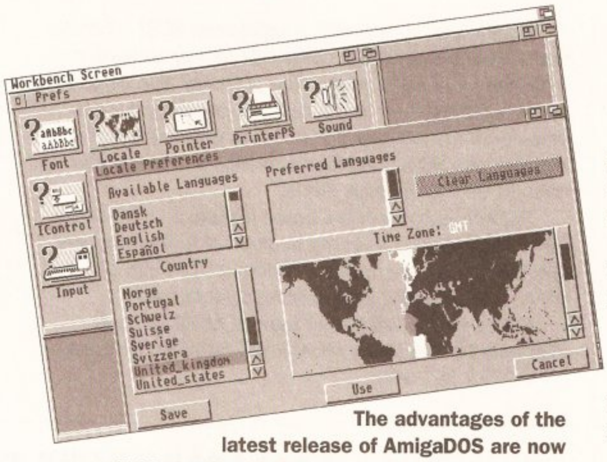
Called *Deluxe Paint IV AGA*, the package enables users to create pictures in both 256-colour mode and also in HAM-8 mode, which offers up to 262,000 colours.

The package sells for £99.99, although upgrades for owners of earlier versions are available. An upgrade from version IV will cost £20, along with the return of the original purchase disk to Electronic Arts as proof of purchase. Version III or II owners can upgrade by sending £65 or £75 respectively along with the front covers from their manuals.

Electronic Arts can be contacted on ☎ 0753 549 442.

Also taking advantage of the new Amigas' graphics modes is Gold Disk's *PageSetter*. Now in its third version, the entry-level desktop publishing package comes complete with a word processor and a paint package capable of handling up to 256 colours. *PageSetter* costs £49 and is distributed by Silica Systems ☎ 081 309 1111.

AmigaDOS upgrades available



The advantages of the latest release of AmigaDOS are now available to all with Commodore's Enhancer packs

Users wishing to take advantage of the extra features of AmigaDOS Release 2.1 can now do so.

Commodore has made two versions of the upgrade available to general users. One (serial number AS216) comes with the software on disk and relevant documentation, for which users will need the 2.0 Kickstart ROM (as supplied in the A500 Plus and the A600), while the other also includes the new ROM. The latter's serial number is AS215.

The upgrade kit contains the Amiga Hard Drive User's Guide and Install Disk, so it will be of particular interest to A600 owners who wish to fit an IDE hard disk (see page 14 for further details). Also included are guides to ARexx, AmigaDOS and Workbench 2.1. The software comes on five disks: Workbench, Extras, Fonts, Install Disk and Locale. This last item is the software that gives Release 2.1 its multi-lingual capabilities.

Other advantages conferred by Release 2.1 include direct support for the PostScript printer language and the ability to directly read disks formatted on the IBM PC. In fact, Release 2.1 is very similar to the operating system supplied with the A1200 and A4000.

The Commodore Release 2.1 Enhancer without ROM costs £55; it costs £89 with ROM. It is available from all major Amiga dealers.

NEW LASER PRINTERS FROM STAR

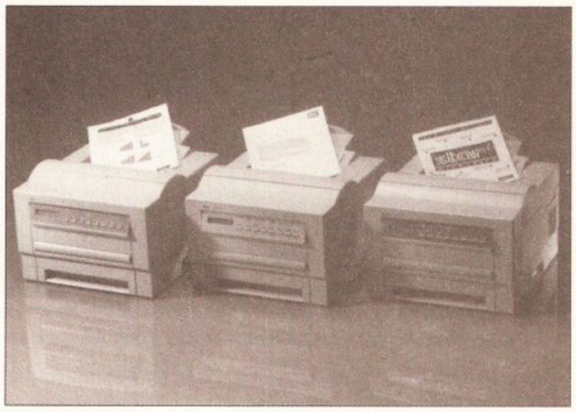
Star Micronics has announced the availability of three new laser printers.

Each is capable of printing up to five pages per minute, at a resolution of 600 by 300 dots per inch. The ink cartridges are capable of printing up to 8000 pages. Control is simplified by the inclusion of a two-line, 32-column LCD screen and two non-volatile user-definable setup memories. Each printer has both serial and parallel ports; by using menu selection to switch between the two, it's possible to share the printer between two machines.

The entry level printer, the LS-5, costs £938.83. Based on the same processor as the Amiga, the 68000, it comes with 0.5Mb of memory, expandable to 4.5Mb. 14 resident bit-mapped fonts are supplied with the printer, but if that's not enough for your needs, you'll be pleased to hear that Star and HP font cartridges can also be added.

The Hewlett Packard Series IIII compatible LS-5 EX is the mid-range machine. For the price of £1173.83, the printer is supplied with 1Mb of memory as standard, which is expandable to 7Mb. Like the LS-5, the LS-5 EX is supplied with 14 resident bit-mapped fonts, but it also has eight scalable Agfa Intellifonts. Star and HP font cartridges can be added, and the printer can be upgraded for PostScript compatibility.

Finally, the LS-5 TT comes in at a price of £1467.58. PostScript compatibility is supplied as standard, as is 2Mb of memory which is expandable up to 8Mb. In the fonts department it has 14 bit-mapped ones, eight scalable Agfa fonts and 35 PostScript fonts. A slot is provided for the addition of an HP or Star font cartridge.



Three new laser printers from Star should appeal to the burgeoning Amiga desktop publishing market

Star Micronics ☎ 0494 471111.

LOW COST COLOUR PRINTING

Seikosha has launched what it claims to be the cheapest 24-pin colour printer around.

The SL-95 breaks the recommended retail price point of £250, coming in at £249. It comes with Epson LQ860 and LQ850 emulation modes, and can print at up to 64 characters per second in letter quality mode or 240 cps in draft. Nine fonts are supplied as standard.

The SL-95's 12-month warranty may optionally be converted to an on-site maintenance warranty at the additional cost of £10. For more information, you can contact Seikosha ☎ 0753 685873.



Seikosha's latest offering is designed to give other 24-pin colour printers some stiff competition

Books for Beginners

Bruce Smith Books has launched the first in a new series of books aimed firmly at beginners.

The *Insider Guide* Series kicks off with *Insider Guide A600*, a 256-page book that explains the basics of the A600 and A600HD, including Workbench, Utilities, Preferences and AmigaDOS.

One of the book's key features is a set of graphical step-by-step instructions dedicated to each important action that the beginner is likely to want to carry out.

The *Insider Guide A600* costs £14.95 from Bruce Smith Books ☎ 0923 894355.

GET COOKING WITH AREXX

PremierVision this month publishes a book aimed at ARexx enthusiasts. The book, called *The ARexx Cookbook*, uses a tutorial approach along with plenty of useful example programs to bring the Amiga beginner up to proficiency in ARexx.

The book itself costs £24. It can also be bought with one or two companion disks. The first contains the programs from the book itself, while the second is full of utilities to be used in conjunction with ARexx, as well as various commercial programs such as *Directory Opus*, *TurboText* and *Art Department Professional*. The book with Companion Disk 1 costs £29.95; with both disks it costs £35.95.

PremierVision ☎ 071 274 4407.

More speed from IVS

The latest in the line-up of Amiga accelerators comes from Interactive Video Systems. Called the Vector, it is a 68030-based card that fits either the A1500 or A2000.

Vector is available with either a standard 68030 processor or the cheaper 68EC030 which lacks a memory management unit. Both the processor and the 68882 maths co-processor are socketed and may be upgraded in the future. The processor may be clocked at either 25, 33 or 40MHz, depending on the version of the board chosen.

Up to 32Mb of memory may be added on board using industry standard 1Mx8 or 4Mx8 SIMM modules. Up to 8Mb of this may be used by the Amiga's 68000 standard processor when in 'fall-back' mode (that is, when the accelerator is not in use).

Vector also comes with a high-speed SCSI controller and a SCSI pass-through connector for the addition of more than one SCSI device. The port may also be used to join Amigas together into a network, enabling them to share SCSI peripherals and data. As with the board's memory, the SCSI controller is available to the Amiga when in 68000 fall-back mode.

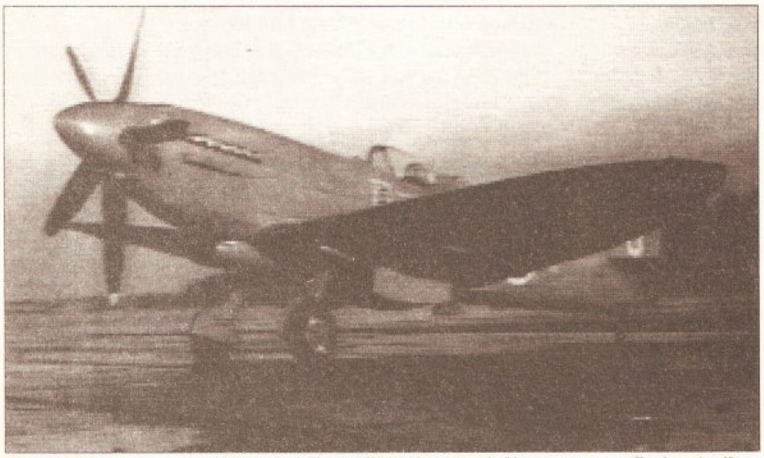
Further features of the board include a Commodore 2630 expansion bus for the addition of further memory, and the ability to re-map the Kickstart ROM into 32-bit RAM, thus speeding up operating system calls.

Prices for the IVS Vector start at £599.95. It is distributed in the UK by Micro-PACE, who can be reached on ☎ 0753 551 888.

INK REFILLS AVAILABLE

Care Electronics has announced the availability of ink refill kits for Hewlett Packard Deskjet and Canon Bubblejet cartridges. The cartridges are available in two sizes: the Care 3 Pack for £14.95, and the Care 6 Pack for £24.95. The Care 3 Pack is available in a wide variety of colours, while the Care 6 Pack is only available in black. Care Electronics are on ☎ 0923 894064.

The Spitfire exposed



Nearly 50 years on and the Spitfire still looks good. Now you can find out all about it on your Amiga thanks to Greendell Technologies

Three disk-based books have been released by Greendell Technologies.

Written using Gold Disk's *Hyperbook* program, the books are described by Greendell as 'interactive information applications'. They deal in detail with specific subjects and are expected to appeal to dedicated enthusiasts. As an added bonus, the pictures within the books may be used separately as clip-art.

The three hyperbooks currently available are *Spitfire!*, *Messerschmitt Bf109* and (somewhat incongruously) *Your First Pony*. For more information write to: Greendell Technologies, 25 Woodleaves, Hollywood, Birmingham B47 5BW.

SCALABLE FONTS FOR DTP AND VIDEO

Agfa has released two font packs for the dedicated desktop publisher and videographer. Both packs contain scalable outline fonts which use Agfa's Intellifont technology, as supplied with Workbench 2 and above.

The *Amiga Start Pack II* is aimed at DTP and word processor users. At a price of £52.88, the pack contains 12 fonts, including CG Times and CG Triumvirate, as well as Park Lane, Brush, Futura and Shannon Extrabold.

The *Video Unlimited* pack costs £76.38 and contains 25 fonts as used in the advertising and broadcasting industries.

Agfa says the packs are part of its policy to make its entire library of Intellifont typefaces available for the Amiga. The company can be contacted on ☎ 081 560 2131.

GET ON COURSE FOR AMIGA TUITION

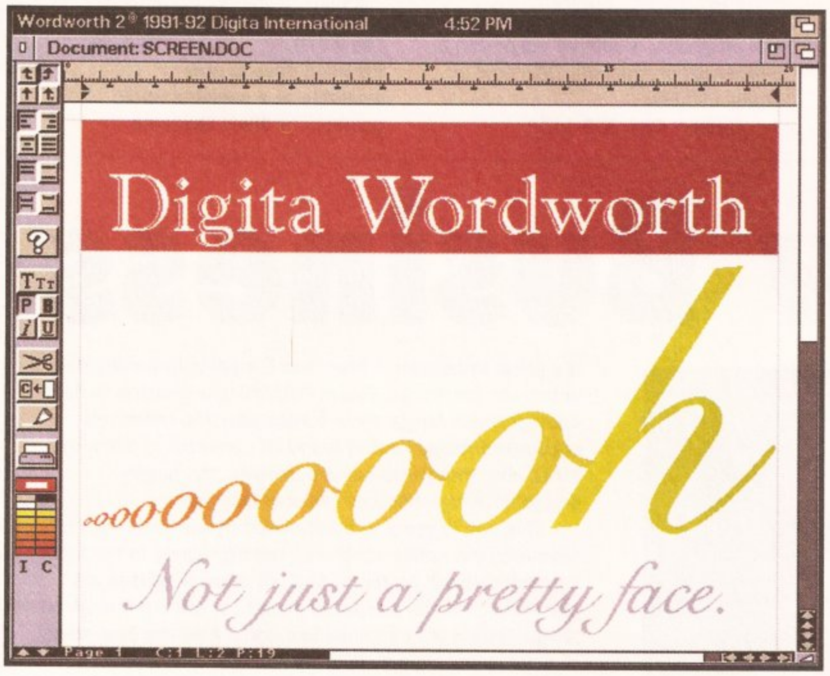
Those of you wishing to extend your working knowledge of the Amiga may be interested in a number of seminars and courses being organised by PremierVision.

The seminars, which are likely to cost £49.95 per person and will each run for half a day, are intended to demonstrate the Amiga's wide-ranging abilities. Seminars are already scheduled to deal with the following topics: Introduction To The Amiga; *Deluxe Paint* MasterClass; Interactive Multimedia Design and Mastering Presentation.

The courses each run for two days. They will be held in Central London for a price of £295 per person, which includes refreshments and lunch. Designed to give practical tuition to a small number of participants, the first two courses will concern the use of *Deluxe Paint* and interactive multimedia design.

Further information can be obtained from PremierVision ☎ 071 274 4407.

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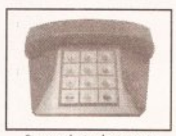

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SILICA'S NEW YEAR SALE

Silica Systems has announced a number of price cuts on the products it distributes and sells.

The company has knocked £100 off Commodore's A570 CD-ROM drive for the A500 and A500 Plus. The drive now sells for £249, and is supplied with a free copy of the game *Sim City CD.*

The company is also selling the old *Cartoon Classics* packs, containing an A500 Plus, *Deluxe Paint III* and a number of games, for the reduced price of £249 – an attractive purchase, perhaps, for those on a tight budget wanting to get into Amiga computing.

Silica has also announced a price reduction on GVP's 8-bit sound sampler, called *DSS*. The package, as well as the sampling hardware, is supplied with two programs: a sample editor and a sequencer or 'tracker'. *DSS* now costs £39.95.

Silica ☎ 081 309 1111.



The A570 CD-ROM drive is now available at a sensible price, courtesy of Silica Systems

Show Business



Yep, it's springtime – and, what's more, it's showtime! Our sister mag *Amiga Format* is set to put on the sort of hugely exciting show that you've come to expect

It's going to happen in May, and it's going to be devoted entirely to the Amiga. Future Publishing's decision to host another major Amiga show comes after the massively successful *Amiga Format World Of Commodore Show* in 1991 and, though we say it ourselves, the hugely enjoyable *Amiga Shopper Show* of last year.

This one is going to be attended by everyone who's anyone in the Amiga world – all the big names in hardware and software will be there. And not a few surprises are planned in the way of special events, which our friends on *Amiga Format* tell us will be like nothing you've ever seen at a computer show before.

You can rest assured that the *Amiga Shopper* crew will be present, ready to offer advice and tips, so do come along if you'd like to meet us in person! And, seeing as it's *Amiga Format* behind the whole thing, no doubt there'll also be a few of those game thingies for those of you looking for relaxation.

We'll have more details for you next month.

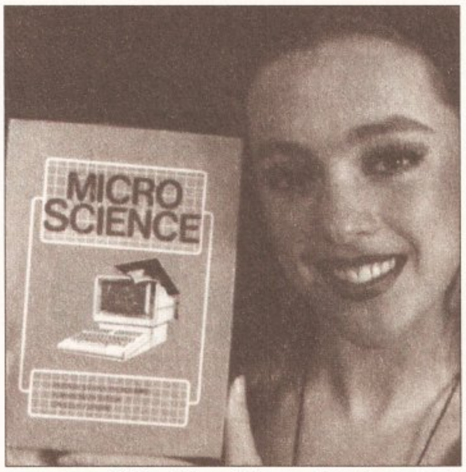
EDUCATION FOR SCIENTISTS

LCL is to launch a new software-based system for students studying the compulsory Integrated Science course.

Aimed at older primary-school children and GCSE students, as well as those adults wishing to improve their understanding, *Micro Science* consists of 24 individual programs, a book and a manual.

It closely follows the guidelines of the National Curriculum, dealing with aspects of physics, chemistry, biology and the environment. The course includes suggestions for practical experiments, and a graphical adventure game is included to help liven things up. Graphics are also used extensively to aid in the teaching of biology, such as an animated simulation of a person eating and digesting food.

Micro Science costs £24 from LCL ☎ 0491 579345.



LCL's *Micro Science* aims to present science with a smile

WARRANTED BEHAVIOUR

Brother is offering the opportunity to extend on-site warranties.

Brother equipment ordinarily comes with a 12-month warranty. This can now be extended for a further one or two years. The price for this depends on the value of the equipment: a year's extension for a dot matrix costs £45, while £130 is the price you'll have to pay if you own a HL-10DV laser printer.

Brother ☎ 061 330 6531.

DIARY DATES

March 6-7: Computer Shopping Spectacular. Telford Exhibition Centre, Telford. Nelton Exhibitions ☎ 0474 536535.

February 19-21: 7th International Computer Show. Wembley Exhibition Centre, London. Westminster Exhibitions ☎ 081 549 3444.

April 23-25: 4th MIDI and Electronic Music Show. Wembley Exhibition Centre, London. Westminster Exhibitions ☎ 081 549 3444.

SOURCE FOR HARD DRIVES

New Horizons Computers is another company now offering IDE hard drives for A600s and A1200s.

The drives come pre-formatted with two partitions, one to hold the operating system and the other, larger one, to be used as workspace. Drives for the A600 come with Workbench 2, whereas drives for the A1200 have Workbench 3 installed. Four mounting screws and an appropriate cable are supplied with each drive. Fitting instructions are provided, or you could use this month's feature on page 14.

Typical prices for the drives are £180 for 40Mb and £250 for 80Mb. New Horizons Computers are on ☎ 0989 750260.

HOOKED ON MIDI CLASSICS

Words & Music has released four new disks of MIDI sequencer data to add to its classical music range.

The sequences can be used immediately with the Roland Sound Canvas modules, the Yamaha TG100 and the Korg 03R/W. They may easily be modified for use with other types of sequencers.

Volume 4 contains music by Mozart, Purcell, Tchaikovsky and Mendelssohn. Volume 5 has ditties from Satie, Debussy, Vivaldi, Handel, Beethoven and Schumann. Volume 6 contains music by Mozart, Bach and Chopin *(Hurrah! –Ed.)*. The fourth new release is devoted to Bach's *Well-Tempered Clavier*.

The disks are £10.95 each from Words & Music ☎ 091 5294788.

A GUIDE TO AREXX

Yet another guide to using ARexx makes an appearance on the Amiga book scene this month.

Mastering Amiga – ARexx is published by Bruce Smith Books. It contains 336 pages dealing with such topics as how to install ARexx, its main features as a language, how to use it to control applications and details of ARexx's built-in functions and support libraries. A disk is also included, which contains programs from the book.

Mastering Amiga – ARexx costs £21.95 from Bruce Smith Books, who can be reached on ☎ 0923 894355.



STATESIDE

A Bible Concordance and a 3D modelling program are two hot new products from the US. Bob Liddil renders unto the Amiga...

In those rare moments of quiet solitude and contemplation, it's nice to be able to look to a higher authority when seeking wisdom. This month, your reflective and studious correspondent was privileged to review *The Context Bible Concordance*, a thoughtful and serious product for the Amiga, from Neuralink (USA).

The folks at Neuralink are committed to serious Bible students as well as the ordinary Amiga user. For the past two years they have provided the Bible in *Thinker* hypertext format. Their latest aid to Bible study is *The Context Bible Concordance*, which provides fast word- and phrase-searching for finding the verses you need to enhance your study and writing.

> "The Context Bible comes with a two-year money-back guarantee"

The Context Bible Concordance contains the entire text of the New International Version of the Bible, and can output to a printer or file in four reference formats, with or without text and/or translator's notes. And it's fast: a search showing all of the 237 verses in the Bible which contain both Jesus and Christ takes less than one second on an unaccelerated Amiga.

SPIRITUAL GUIDANCE

Using *The Context Bible Concordance* is easy, for either Bible study or sermon notes. Teachers or ministers will find it helpful for lesson preparation, printing handouts for students, class or home use. As might be expected from someone presenting a Holy Work, *The Context Bible* comes with a two-year money-back guarantee.

Also included is an interesting and thought-provoking book, *God's Work in God's Way* by William S Dillon. This volume is certainly a welcome bonus to an already well-endowed package.

Checking the prices I discovered that the *New International Version Context Bible Hypertext* with *Thinker* and Concordance is $150. The *New International* or *King James Version Context Bible* with *Hypertext* and *Thinker* is $100. The *New International Version Hypertext* by itself is $50, while you can get just the *New International Version Concordance* for $50.

If you still can't make your mind up about which one you need, then write to Neuralink and ask for the free demo disk. It includes a demo version of *Thinker*, the entire book of Ephesians, the help file, and the *Hyperbook* tutorial for the *Concordance*. I'd send along a few International Reply Coupons to help with the return mail, not because they are required (they aren't) but just to be nice. Tell 'em that the Amiga Cowboy suggested it.

You can contact: Jack Seay, Neuralink, PO Box 16311, Lubbock, TX 79490 USA ☎ 0101 806 793 0423 or 0101 800 657 8822. Or for Australia or New Zealand pricing, contact Mark Sims, 2 Pygmalion Place, Hamilton, New Zealand.

24 BITS ARE BEST

Onward down the trail... Nothin' excites an old cowboy like Amiga graphics, and the pictures coming off my monitor screen nowadays are even better than before – thanks to a new program.



This could be your chance to introduce your Amiga to the Good Book, with *The Context Bible Concordance* from Neuralink (USA)

Octree Software has introduced the latest version of *Caligari*, titled *Caligari24*. Unlike older programs, *Caligari's* direct manipulation actually mirrors the everyday world. Objects can be moved, rotated and scaled by simply pointing the mouse, so there's no menus to access ("Hooray!" shouts the Cowboy). And everything happens in real time.

Caligari24 will run on all Amiga models with a minimum of 2Mb of RAM, although 3Mb or more is recommended. A hard disk isn't strictly necessary (unless you want to do photorealistic rendering), but you'd have to be loco to try using *Caligari24* without one. An accelerator for 32-bit and floating point operations is strongly recommended as well, permitting *Caligari24* to operate at substantially higher speeds.

Caligari24 outputs up to 736 by 482 resolution in NTSC video or 736 by 575 for PAL, with up to 32 bits per pixel. It reads and writes *Videoscape* and *Lightwave 3D* object formats. Additionally, it reads *Sculpt 3D, Imagine* and *Autocad DXF 3D* object formats. *Rendition*, IFF and DCTV images can be used for texture mapping. Several other programs such as *Pixel 3D, Broadcast Fonts* and *AdPro* also support the *Caligari* format. The package includes a comprehensive manual and a tutorial on video tape.

Almost all registered *Caligari* users should be eligible to upgrade to *Caligari24*. The total cost of upgrading, which includes shipping and handling, is a very reasonable $109.00 for US users and $129 for international users.

By the way, Octree Software is also distributing *DynaCADD*, a leading CAD/CAM package, to its *Caligari* users. The costs are $509 for US orders and $529 for international orders. Maybe I could design a reasonable starship with *DynaCADD*, or perhaps an improved navigation system for the QEII to keep her off Cape Cod Rocks?

For more information, you should contact: Octree Software, 1955 Landings Drive, Mountain View, CA 94043 USA ☎ 0101 415 390 9600, or 0101 415 390 9755.

> "Caligari's direct manipulation actually mirrors the everyday world"

Now it's time for your Amiga Cowboy to meander off into the sunset, blithely pulling cactus spikes out of my posterior parts. (The cord to my Amiga pulled me off my horse. I was trying to rope cattle and edit my startup-sequence at the same time!) But I would like, before I go, to put out a request for mail. What would you all like to know about Amiga in the USA? Would you like a discussion of Amiga bulletin board services, for example? Help me out with this, couldja? Meanwhile, until next time, it's whoopie-tie-yi-yea and so long, pardners! AS

Talking *Shop*

Welcome to the Amiga world's liveliest letters pages! – the place where you get the chance to speak your mind. So join your host, the Editor, Cliff Ramshaw, for some more no-holds-barred bantering. And remember, all you have to do to be included is send your missive to: 'Talking Shop', *Amiga Shopper*, 30 Monmouth St, Bath, Avon BA1 2BW. So get to it!

THAT NEW AMIGA

I noticed in the January issue that one of the retailers had a 1400 Amiga computer in their price list. The 1200 and 1500 were also listed so it seems unlikely that it was a mistake involving these two Amigas. If this new machine does exist I wonder if you have any official specs; on the other hand if it is a mistake you'd better inform the advertiser in question.

I have also noticed that some of the response to the new 1200 has been a little negative. I admittedly was unsure about the 1200; after all, where was the improved sound, HD drive and '030 chip? But, as Commodore mentioned, it is not possible to have these features on a machine priced at £400. People have also criticised the exclusion of a SCSI but the wide majority of people only use this interface for a hard drive. Though SCSI drives are faster you can pick up a 120Mb IDE hard drive for £260. This has to be considered as a big benefit and, to be honest, how many people really have tape streamers that they use with their Amiga?

Commodore has just released a machine that delivers better graphics than either a PC or a Falcon, with performance similar to that of a 386SX. It's not a perfect machine but I am sure if Commodore had intended it to have a £500 to £600 price tag they would have included the above features (all of which I believe Commodore will offer in the form of expansion cards or in the mythical 1500/2000 replacement).

Shoa Ming Fung
Tottenham, London

I imagine the A1400 was a misprint for the A4000. Commodore has issued no details of a new Amiga, but we strongly believe that a cut-down version of the A4000, with a less powerful processor, will soon be appearing. As for your remarks on the A1200, I agree – I think it's a wonderful machine.

STRENGTH IN NUMBERS

I run a small PD library which was originally put together after some friends and I felt 'ripped off' by some of the larger PD libraries in this country. By 'ripped off' I mean that between twelve of us we have: received virus-infected disks, programs without docs, disks that were only 15% full, shareware disks with the authors' details erased, had cheques cashed with no goods sent and been charged exorbitant prices. Rather than just sit back and slowly steam about this, I decided to put together the kind of library that I personally would use.

We are now compiling what we hope will be a comprehensive listing of any and all user groups, together with any other interested commercial listings. The final compilation will be in a database format and released as PD under the title AUGIR, the Amiga User Group International Register. We are particularly looking for groups outside Europe.

Entry for all user groups will be totally free. For commercial listings, however, there will be a one-off payment of £5.00.

The information we require is:

- **A contact name and address for each group.**
- **Level of acceptance: learners welcome, elite only, or whatever.**
- **Bulletin board information: baud rate, fees, times...**
- **Number of members.**
- **Particular interests: demo coding, swappers, DTP, and so on.**

We regret that at this time individual users cannot be entered in the compilation.

Any group who wishes to be registered should contact the following address: AUGIR, Computer & Design Services, Dept PD, 24 Blackmoor Croft, Tile Cross, Birmingham B33 OPE, England.

Bob Powell
Birmingham

Well, Amiga users of the world, this is your chance to unite.

MOTOROLA'S NEW GENERATION

In the accelerator article in the December issue, Toby Simpson speculated about future members of the 68000 family and concluded that the next member (68050 or 68060) would be the last one. Allow me to set the record straight.

- **68050 – This is actually a special version produced for (I believe) Ford. It is a 68040 running at 50 MHz and will probably not be released to the public.**
- **68060 – Development is under way and first samples should appear early 1994. This will most likely continue the theme of 'better, stronger, faster'.**
- **68070 – Philips pinched this name years ago! MP and XP are the code names for the next two 68000 series devices Motorola has promised, although it is not giving any clues as to what these will be (68080 and 68090?) or what form they will take.**

There are two more points in your January edition which I wish to discuss.

Firstly, in your reply to AS Cuddwell, you said that it would be possible to unplug the A1200's 68020 and plug in an '030 or '040. How do you unplug a surface-mounted chip and plug in another chip (possibly with a different pin-out)?

Secondly, the cover disk contained some useful utilities, but if I may quote Ian Wrigley on page 158 (regarding a disk he reviewed which contained *ReOrg*, as also supplied on your disk): "I think that any utilities disk which includes a defragmenter should also be forced to contain a backup program too." Need I say more on this one?!

Keith Noble
(via e-mail)

Thanks for the info on Motorola's plans, Keith.

As regards replacing the A1200's processor, it is actually done by plugging a processor board into the trapdoor slot. And as to your point about the hard disk backup program... er, it's on this month's disk!

And by the way, anyone else who ends their letter with words to the effect of "I bet you do not print this letter" will guarantee just that.

DISK DISCUSSION

Sometime ago I advertised a Workbench replacement disk to readers; the response was pretty high. "So what?" you say. Well as a competitor of yours sells one at £4.50 (most programs are still shareware), why don't you construct an *Amiga Shopper* Workbench as a cover disk? It would need the following things:

- **Easy-to-use directory utility**
- **Icon manipulator**
- **Cruncher**
- **Easy-to-use editor**
- **Disk optimiser**
- **Disk repair**

Benefits of this are that beginners would improve and more experienced users would find it a useful tool. Add 'how to' tutorials to this and you have a winner.

Speaking from experience, no-one complained about my compilation. What about it Cliff?

James Abram
Wolverhampton

Not a bad idea at all, James – I'll give it some serious thought. If, in the meantime, anybody out there has any other ideas for the contents of the cover disk, please don't hesitate to drop me a line.

DECISIONS ON DRIVES

In February's issue you stated that there would be an in-depth article in next month's issue about how to choose, fit and use an internal hard-drive for the A600 and A1200. Are you really forgetting the A500 already? Several suppliers sell internal hard drives for the A500. So why not include the A500 in your article? There are many more A500s than A600s and A1200s.

Douglas V Griffiths
Saxilby

The reason we chose to concentrate on the A600 and A1200, Douglas, is that owners of these machines

currently have no other option but to fit internal drives. If they want a hard drive they have to go through the process described on page 14, whereas A500 owners have the far easier method available of fitting a drive to the expansion port. Fear not, we haven't forgotten the A500, and an article on internal drives may well be coming up in the future.

NOT A HAPPY CHAPPY

I am afraid to say that I am not impressed. I sent you Issue one of my disk magazine *Dual Impact* about 11 months ago, and it took about five issues to get reviewed. When it was reviewed I was extremely pleased because, without your review, I would only have got a total of one sale.

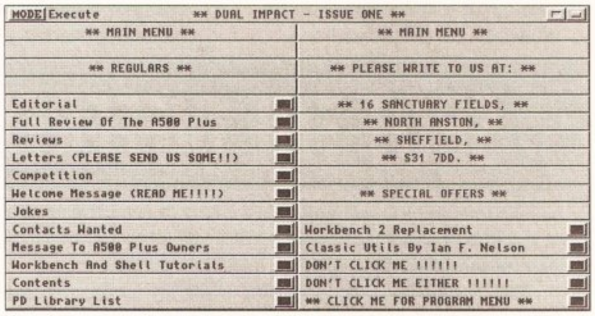
As soon as you had reviewed the first issue, I set to work on a second and sent it to you about five months ago now. I was expecting it to be reviewed pretty soon, and when I saw in Issue 20 that you were planning to do a disk magazine round up in Issue 21, I expected that it would be reviewed then. Unfortunately *Dual Impact* Issue two was not included. I wouldn't mind the amount of time it takes to get PD reviewed in your magazine but, when I look at the issue with the review of my disk magazine (which by that time was five months old), there are reviews of public domain software that isn't even a month old. These programs all seem to be supplied by the big PD libraries, and frankly this just isn't fair.

People like me rely on your magazine to get a review, and thus some publicity. If you think about it your magazine is like a newsagent to me: if there weren't any newsagents your magazine wouldn't sell nearly as well as it does.

The disk magazine section only comes up every now and again. I think it should be just as regular as your utilities section, or your demos section. Please make it a more regular section, as it will help me and many others who take a lot of time to write disk magazines.

I also don't regard your PD section to be anywhere near big enough, totalling about four pages each issue. I am sure you get plenty of programs to review each month, probably enough to fill about ten pages – so do it!

Chris Aubrey
Sheffield



Here's a gratuitous plug for Chris Aubrey's *Dual Impact* disk magazine, just to show its exclusion was nothing personal

Sorry you're not happy Chris; let's try and answer your points. Firstly, there is no preference given to larger PD libraries – the contents of the section are determined by Ian, who bases his decisions on those programs that most interest him.

It's a shame that *Dual Impact* had to wait so long to be reviewed, but this happens with many products, not just PD – there just isn't the space to review absolutely everything as soon as it comes out; we have to decide what will be of the most interest to our readers. And I think your argument about us being the equivalent of a newsagent to you a little contrived: after all, newsagents make a profit from selling copies of *Amiga Shopper*.

Sadly *Dual Impact* did not make it into the round-up in Issue 21, but I'm sure there were several other disk magazines that also weren't included for reasons of space.

The idea of expanding the PD section is of course attractive, but I would have to carefully consider the value of PD to the readership, as compared to the value of something else that would have to be dropped to yield the space. I'll bear your comments in mind.

PULLING THE CLAWS OF THE FALCON

I read with interest Mr Thomson's letter in the February issue of *Amiga Shopper*. Although, as you said, he did make some valid points, I felt that he came down rather hard on the A1200 (the machine I am currently writing this letter on).

From his comments I would say that Mr Thomson was getting his information from a certain ST magazine. I, too, read the article in this magazine; they made some interesting 'omissions'!

Firstly, although the Falcon does have a more powerful CPU, what Mr Thomson forgot to mention was what has always been the Amiga's real strength, the custom chips. The AGA chip set is effectively 64-bit and has a blitter, graphics co-processor and excellent sprite hardware. The Falcon's answer to this is its own blitter, and that's it. No sprites (a fact that Atari fans like to keep hidden!) and no graphics co-processor. Is Mr Thomson trying to say this incredible power will not make any difference?

He should really come and see how I can drag around a backdrop-laden screen several times the physical size of my TV using Workbench 3 – smooth does not begin to describe it!

Secondly, an awful lot of people seem to be making a tremendous fuss over the high-density floppy drive on the Falcon. Although this is a very nice floppy drive, it is the only floppy drive we will see fitted to the Falcon. Another little-known fact about this 'wonder' machine is that you can't fit any more floppies to it. I will be able to fit another three to my machine when third-party developers get going.

Thirdly, what is this business about the Amiga not being able to manipulate its enhanced graphic modes as well as the Falcon? This, too, is straight from the ill-informed pages of a certain ST magazine. What then is AGA for, just displaying nice HAM-8 pictures? Atari are seemingly very proud of the fact that the Falcon possesses true 16-bit colour (not using methods such as HAM) but it follows that true 16-bit colour requires 16 bit planes. HAM-8, on the other hand, as its name suggests, uses only 8-bit planes to deliver 256,000 colours.

Now, if the Falcon, using a 32-bit blitter, has to shift twice as much information as an Amiga using a 64-bit blitter, which machine is going to come out on top? It beats me how the Atari fanatics came up with that one. If it is because animations are done using differences between each frame, then yes, this shifts the balance slightly in the Falcon's favour as the differences are likely to be greater using HAM, but twice the information is still twice as much.

The next part of Mr Thomson's interesting letter I'd like to address is the "100 developers beavering away with ... er... developments". Exactly. Who are these developers? What are they developing? The ST magazine printed this propaganda, with no details, to increase confidence in a machine seriously behind its launch-date. The Amiga scene is buzzing. I can already buy 2 and 4Mb PCMCIA cards, CD drives and an FPU for my machine.

Finally, quite apart from the fact that the Falcon ships with only 1Mb, it has no concept of Chip and Fast RAM. This, as you rightly pointed out, will cripple the machine's CPU and blitter as each tries to access the memory.

Ian Miguel
Lockerbie

'I CAN LARF ABOUT IT NOW'

Have you learned a valuable lesson from the trials and tortures of experience, or overcome some mind-boggling problem through incredible ingenuity or even sheer luck? Then let us know and win yourself a fiver into the bargain. Just send your post-embarrassed tomes to 'I can larf about it now', Amiga Shopper, 30 Monmouth St, Bath BA1 2BW.

Here's possibly the first recorded successful use of Disk Doctor:

READY TO OPERATE?

I know I am supposed to make back-up copies of important disks but I did not on one particular occasion – and it happened to be the disk that contained all my word processor files since April 1992.

After purchasing and playing Team 17's *Assassin*, I saved the high score table on the above-mentioned disk. Everything was OK until I came to load in some files I had been working on in *Protext*, when, horror of horrors, the Amiga did not recognise the disk and apparently all my files had gone.

After giving it a bit of thought I decided to put the disk through *Disk Doctor* and, hey presto, all my files were replaced and *Protext* was able to load every single one! Most people think *Disk Doctor* is a bit severe for the purpose it was designed for, but it certainly saved my sanity. Needless to say I have a backup of this disk now.

Martin Kaminski
Horsham, West Sussex

This is positively the last letter I'll print about the Falcon, unless someone has something new and incredibly constructive to say.

There is still the problem of misinformation regarding the Falcon. When we originally compared its specs with those of the A1200, we were going on information that couldn't be confirmed because no-one at the time had seen a Falcon (hence the mistakes that crept in and which some of you have written to correct).

Similarly, no doubt, the writers of the ST magazine you refer to don't really understand the Amiga's strengths.

WORTH A TRY

Re: your letter in the Feb issue – I am not J Doig, P McKeown or H Owens, but I enclose my address and I would like some money.

C Shea
Swansea

No... next? AS

So, you want to save yourself some money and install your own hard drive? Well, before you start, it's important that you know at least a little about hard drives in general. That should extend as far as knowing what one is, what it would do for you, and why you would want one. If you are not really sure about any of these, then this upgrade is not for you. But, if you do know about hard drives, are handy with a screwdriver and have a great deal of patience, then there is no earthly reason why you shouldn't install one yourself into your A600 or A1200.

This article describes in detail how to install a hard drive into your A600 computer. There is also a section which specifically applies to the A1200, and shows how to perform the same operation on this slightly different machine. In addition to general knowledge about hard drives, you'll need to be familiar with the operation of your Amiga, which includes being able to operate the Shell, and Workbench applications. Last but not least, you must also be prepared to follow the instructions carefully. Read every section before trying to carry any of them out. If you get something wrong, you can cause expensive damage to your precious Amiga – and that is the very last thing we want!

Installing a drive yourself is cheaper than getting someone else to do it, but is still going to set you back a fair sum. For a 20Mb drive you're talking about a total cost of about £80 or less, depending on the price and availability of drives. You're also looking at a great deal of time. It's not simply a matter of buying a drive and plugging it in – for evidence of this, just flick through the following five pages to see how long this article is! Depending on what bits you need, the whole process could take you a week or more. Let's go over exactly what you need to install a drive in an A600:

- **One A600, without a hard drive.** That's the easy bit.
- **One 2.5-inch IDE hard drive of suitable size.** These drives are commonly found in portable computers, such as the notebook IBM-PC compatibles. Consequently, they are widely available, and are good value for money. They come in a variety of sizes ranging from 20Mb to around 160Mb. I recommend looking at the 40Mb or 60Mb devices if you can afford it, as 20Mb fills up very quickly indeed.
- **Kickstart 37.300 or higher.** This is extremely important, as it dictates whether or not you can simply plug in a drive into your machine and go. To find out, boot your A600 off the workbench disk, and select 'About..' from the Workbench menu. If it reads "Kickstart version 37.299", then you will need to replace your Kickstart ROM in order to use a hard drive. If it shows "version 37.300", or higher, you will not need to obtain a new Kickstart.
- **Hard disk installation software.** In particular, you will need a program called *HDToolBox* which will enable you to format and partition your drive for use. At the very least, you absolutely must get *HDToolBox* in order to use your hard drive once you have installed it.
- **Two small screwdrivers** – a flat bladed and a cross-head one.
- **An IDE cable to connect the drive to your A600's motherboard.** Consult the list on the facing page for suppliers of these.
- **A great deal of TLC ('Tender Loving Care') and patience.** You should know what this is for. One specific piece of advice I'd offer is: don't drink too much coffee before starting. Your hands will shake!

Now we've established what you'll need, let's discuss the operation in a bit more detail. Your A600 computer comes complete with a hard drive interface for IDE-type hard drives. It contains enough space for one 2.5-inch IDE drive to be mounted internally, which can be powered from your A600 without the need for any external cabling, or additional power supplies.

There are a few different drive types around, and it's important that you don't get them confused. Currently, the most common types are known as 'IDE' and 'SCSI'. SCSI is a faster and more advanced hard drive system. It's more expensive than IDE, and is commonly found in higher end machines such as the A2000 and A3000.

IDE, on the other hand, is less advanced. As a result of this, it is cheaper. Because of this, Commodore could afford to put an IDE interface in every A600 computer. For some reason they also put IDE into the A4000, but who are we to argue with their choices? IDE is not compatible with SCSI and vice versa. You cannot connect a SCSI drive to an IDE interface, and you

OUT ON YOUR OWN

Adding a hard drive to your Amiga is reasonably straightforward, but because it involves taking your computer apart, it is not recommended for the faint-hearted. Following this guide will invalidate your warranty, and you could potentially cause expensive damage to your computer.

If you are not sure about what you are doing, then by all means get the job done by someone who is, preferably a respectable dealer. *Amiga Shopper* can accept no responsibility for any damage or loss of data occurring as a result of information in this article.

SPOT THE DIFFERENCE

A1200 owners! Please make sure that you read the section on the A1200 at the end of this article before you rush off to try following the installation guide that appears over the next few pages.

The installation procedure differs slightly for A1200 owners, while some drives are known to be incompatible with this newer machine.

JARGON BUSTING • JARGON BUSTING • JARGON BUSTING • JARGON BUSTING • JARGON

HDToolBox – A special program on the Amiga which enables you to install and partition a hard disk. It's also quite handy for verifying the contents of your hard disk, and enables you to bypass any errors that might appear. You can literally map out the faulty parts of the hard disk and the Amiga will ignore them.

IDE – Integrated Drive Electronics. A type of hard disk. The A600, A1200 and A4000 computers come with IDE hard disk interfaces built in. These drives are most commonly found on IBM PCs and compatibles.

Motherboard – The main PCB ('Printed Circuit Board' – see next entry) inside your computer.

PCB – Printed Circuit Board. The board with all the components mounted on it inside your computer.

PCMCIA – This is the slot on the left-hand side of your Amiga 1200 or 600 which accepts industry-standard cards. More of these are becoming available, and they are a convenient way of expanding your RAM. As they become more popular, prices will drop. They are used a lot in the portable PC market as a smaller floppy-type storage device, the difference being that they have no moving parts, are more reliable and require less power to operate them.

Partitioning – Making a large hard disk pretend to be several smaller ones.

ROM – Read Only Memory. This is memory that is permanent. You cannot write to it, and it retains its contents if you switch your computer off. The ROM inside the Amiga contains the Kickstart which makes your computer work. This is different from RAM, Random Access Memory, which you can read and write to, and loses its contents on a reset or loss of power.

SCSI – Small Computer Systems Interface. Compared to IDE, this is a faster and more advanced type of hard disk. It is more commonly found in higher end machines, such as the A2000 and A3000. Don't ask why they didn't put SCSI in the A4000, as I have no answer for that!

TLC – 'Tender Loving Care'. This is where you make an extra special effort to take extreme caution with something. It's where you think twice before plugging something in and make sure it's the right way round, it's where you check everything at least three times, and it's the most easy way of guaranteeing that the job you're doing will actually be a success. In the long run, TLC ensures a job is completed sooner than hurrying, as when you hurry, you make mistakes, and they take time to fix. Honest. I've blown up an A3000 by ignoring my own advice!

Plug in and go



Thanks to IDE technology, it's surprisingly easy to add a hard drive to an A600 or A1200. Toby Simpson takes you step-by-step through the whole procedure

cannot connect an IDE drive to a SCSI interface. I cannot stress this enough. Many of you will have SCSI drives for A500 computers, and are maybe thinking that you can add these to your A600. Quite simply, you can't – until someone builds a SCSI interface for the A600.

WHAT WILL WORK ON MY MACHINE AND HOW MUCH WILL IT COST?

Approximate prices of suitable IDE drives for your A600 are listed below. Four sizes are included in the list, 20, 40, 60 and 80Mb and prices are for the 2.5-inch versions. No other sizes will fit inside the A600. For each of the four categories, up to two known working drives are listed.

Size:	Approx Cost:	Suitable brands:
20Mb	£120	Conner CP2024
40Mb	£180	Seagate ST9051A, Seagate ST9022A
60Mb	£200	WDA8260, Seagate ST9077A
80Mb	£250	Seagate ST9096A

Having said that IDE is slower, it is important to put this comment in some sort of perspective. By 'slower', I do not mean that the drive crawls along at, say, the same pace as a floppy disk. In fact, IDE requires more of your computer's time to process the data. Consequently, when you are using the multi-tasking abilities of your Amiga computer to its fullest and trying to access your IDE hard drive, it is likely that you may notice some reduction in speed. The 2.5-inch IDE drives themselves are the height of modern technology, and are certainly nice and quick.

Another point worth considering is that once you have a hard drive installed, you will have slightly less memory available – this may affect some programs that you use. This is discussed in greater detail later on, where some suggested expansion devices are also listed.

NO TURNING BACK

Think very carefully before embarking on this job. If you can afford it, or don't want to risk the damage, get a dealer to upgrade your A600 for you. Also, Commodore is likely to bring out its own hard drive kit for the A600 at some time in the near future, and you may prefer to wait for that if you are not in any particular hurry. But then again, you could end up waiting forever!

When you have decided that you want to do it yourself, there are several more things you should think about – apart, of course, from resolving to follow each instruction to the letter. First, you should consider the size of drive you will require. If you just want it to do a little word processing, and that's all, then 20Mb will almost certainly be enough. A nice simple formula to work out how much hard disk space you will probably need is this. Count how many floppy disks' worth of information you want to put on your hard disk. Multiply this total by 2. That is the size, in Megabytes, you will require. Clearly this is a very rough way of doing it, but it will give you sensible answers in most cases. The most common sizes of 2.5-inch IDE drives are 20Mb, 40Mb, 60Mb and 80Mb. I would strongly recommend the 40 or 60Mb drives for general work and data storage.

Users out there who want to carry out tasks such as ray tracing, programming, DTP and other disk-intensive occupations really do need 40Mb – at least. I would only consider the 20Mb drive if you're on a tight budget, or as I mentioned earlier, have simple requirements of your upgrade.

And finally, this might also be a good time to consider selling your A600 and getting an A1200. If you're not just a games player and use your machine seriously, it may be worth taking this opportunity to upgrade, especially if you would benefit from the extra speed. The A1200 has more memory (2Mb), better graphics and expansion potential – and Workbench 3 of course.

GETTING THE EASY BITS

The 'easy bits' are the drive, the cable, the screwdrivers and (hopefully) the patience and the TLC. Consult the list of suppliers just to the left, and buy yourself a 2.5-inch IDE drive and suitable cable. If there's any doubt as to which cable to order, order an "IDE cable suitable for connecting a hard drive to the Amiga A600, internally." Also, get yourself a couple of screwdrivers, your A600 and you're almost ready.

AND THE NOT-SO-EASY BITS

As with just about everything in life, there is a catch. In this case there are two catches, and both fall under the category of Commodore. If you've discovered that you have an incompatible Kickstart version (37.299), then you will need a suitable Kickstart ROM. Either way, you will need Commodore's *HDToolBox* to be able to use your A600 hard drive. Both these items can be bought from Commodore's spares department. You'll need:

- **Kickstart 37.300 ROM chip** for the A600.
- **2.04 Hard Disk Install Disk**, containing the *HDToolBox* application.

Your local dealer may be able to help you on both counts. Once you have obtained these bits and pieces, you are all ready to get installing. If you do need to put in a new Kickstart ROM, this is explained in Step 2.

READY FOR ACTION

I honestly can't say this enough, so this should be the fourth or fifth time you have read something like it in this article. It may sound patronising, but – be careful! Your cheap hard disk upgrade can turn into an expensive nightmare if you hurry. But that's enough of the preaching – on with the practical. What you'll find over the next four pages is a six-step guide with diagrams, explaining the complete task ahead. Get yourself a well-lit surface, get all your bits together and away we go!

SUPPLIERS • SUPPLIERS • SUPPLIERS • SUPPLIERS • SUPPLIERS

There are a number of suppliers of Amiga-compatible IDE drives and cables. Here's a good selection to get you started:

Brian Fowler Computing
3 Hedgerow Close
Crediton
Devon EX17 1DB
☎ 0363 775400

Evesham Micros
Unit 9
St Richards Road
Evesham
Worcs WR11 6XJ
☎ 0386 765354

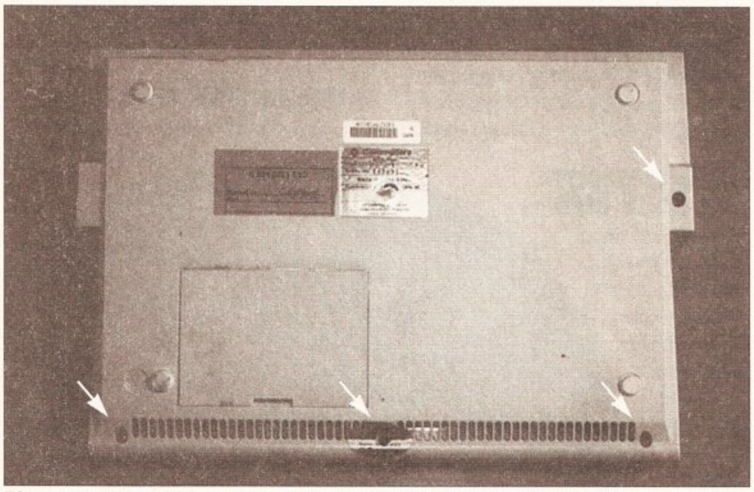
New Horizon Computers
High Hope
Lea
Ross-on-Wye
Herefordshire HR9 7LN
☎ 0989 750260

Software Demon
PO Box 90
Penzance
Cornwall TR18 2SP
☎ 0736 331039

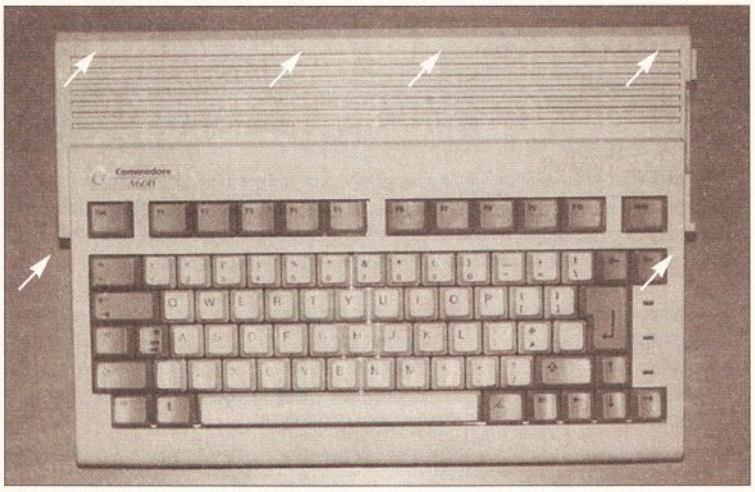
Watford Electronics
Jessa House
250 High Street
Watford WD1 2AN
☎ 0923 237774

For general information, and other hard drive-related products:
Commodore Business Machines (UK) ☎ 0628 770088

STEP 1 OPENING THE MACHINE



Picture A: The A600 positioned face-down on your working surface. To get it apart, first undo the four screws along the bottom and right-hand edges



Picture B: Now turn the A600 the right way up again. Next, you need to separate the six clips which are still holding the case together

Unplug everything. Then turn your A600 upside down, and undo the fixing screws shown in Picture A. Don't get carried away unscrewing things – you only need to unscrew these four. At the risk of patronising you a little more, don't lose the screws! (Of course, you wouldn't do that – would you?) Once you have removed the screws, you have the fun (and slightly scary) bit to look forward to.

Turn the machine back up the right way – don't worry, it won't fall apart. Then turn it the right way around so that the keyboard is facing you. Six clips are holding the case on: four along the back where the connectors are; one on the right between the 3.5-inch disk drive and the '2.GAME' joystick port; and one on the left at the far end of the PCMCIA slot. They are indicated in Picture B.

PRISE PERFORMANCE

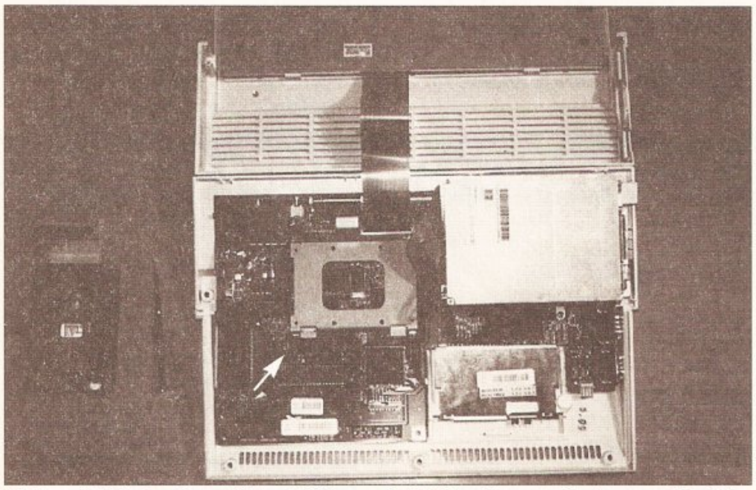
Your small flat-ended screwdriver should do the trick with these clips, or if all else fails, use a sharp knife. Start with the clip next to the disk drive and work around the back. It's handy to have a friend around to stop them all from clipping back. Gently prise each clip apart, all the while exerting a little pressure to pull the two halves of the A600 apart at the keyboard front end.

Be extra careful here, as by the time you've done a few clips, the case will literally fall apart – unless you're holding onto it, you can damage the keyboard connector. Lift the top of the case up about an inch and put it down two inches to the left. Your A600 should now look like Picture E on the following page.

INTERNAL AFFAIRS

You should be able to see a bit of the drive, and more importantly, the keyboard power connector at the bottom right. Disconnect this, remembering that the black wire was at the right-hand disk drive side. You may need to slide a screwdriver underneath it in order to get it free. Now tip the keyboard half way over so that it is upside down. Your A600 should now look pretty much like the one in Picture C.

STEP 2 LOCATING THE DRIVE POSITION



Picture C: The insides of the A600 revealed. The drive cradle (arrowed in this picture) is where the new IDE mechanism will go. If you have an old version of the Kickstart ROM, you'll need to install a new one of these as well

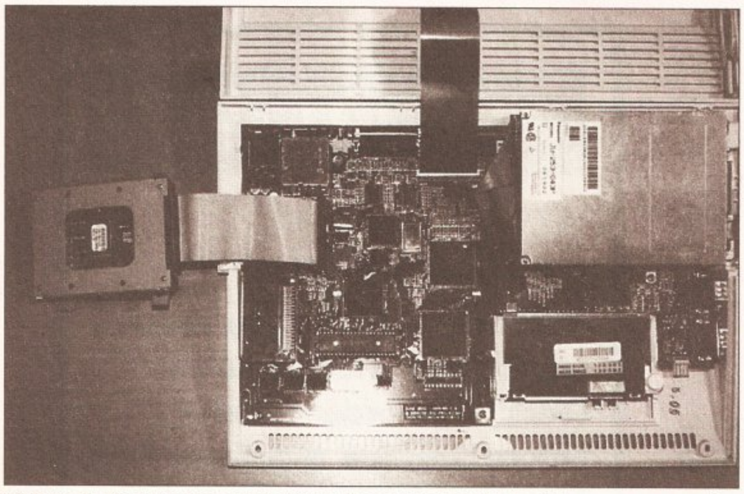
Now you've removed the casing, you should familiarise yourself with where everything is, especially noting the drive cradle, as shown in the photo. It's quite fun to have a good look around anyway. Note also the large 40-pin chip at the bottom left of the PCB. This is your Kickstart ROM. If you have had to buy a new one, this is where it goes. If you have not, skip the rest of this section and proceed directly to Step 3.

First, you have to remove your old Kickstart ROM. This is in a socket, so it is a reasonably straightforward procedure. Place a flat-edged screwdriver under the left-hand side and rock it lightly left and right to prise up one end of the chip slightly. Then repeat this on the other side. After a couple of goes, you should be able to grip the ROM, with one finger at each end, and lift it out. Put this somewhere safe as an emergency back-up – in case you damage your new ROM by accident.

KIND BUT FIRM

Now, ensuring that the ROM is the right way up (with the little notch pointing towards the PCMCIA slot on your A600), line up the pins with the holes, and carefully exert pressure evenly over the surface until it pops into the socket. Now press it down firmly and check around the sides that each pin has gone in correctly. If one hasn't, remove it and start again. You may need to bend the particular pin inwards slightly. Remember that chips can be damaged by static electricity, so always handle them with care, and avoid touching the pins if you can.

STEP 3 POSITIONING THE DRIVE



Picture D: Remove the cradle from the computer (it should come away quite easily), then screw the drive to it. Then you need to link up the connecting cable. Make sure this is firmly attached, as well as the right way round!

Now screw the drive to the cradle. You should remove the cradle from the machine in order to do this – it is not screwed down and will come out easily if you pull it. Attach the cable to the drive first, and then to the PCB. The cable can only be attached in one way – if you try any other way, it won't fit when you attempt to re-seat the cradle. You should find the cable has a mark down one side of it. This is the 'Pin 0 indicator'. On most cables, it's a coloured strip of red or black. Locate this, and ensure that it points to the Kickstart ROM. This will help you to get it the right way around.

Once you've done that, make a careful comparison between what your A600 looks like now and Picture D. They should look the same.

Double check everything, but especially make sure that:

1. The cable is firmly attached to each end of the drive.

2. Both the cradle and the drive are the right way around.

3. If you've had to install a new Kickstart ROM, check it's the right way around, and that all the pins are in the socket.

4. Now check it again, and compare it against Picture D.

5. If you have not checked it thoroughly enough, I'll probably find you back here again in about five minutes' time!

STEP 4 CONNECTING EVERYTHING UP



Picture E: Carefully fitting the A600 back together again

Place the drive cradle back in its original position over the PCB, this time with the IDE drive firmly attached to it. Take care not to knock or drop the drive mechanism while you are doing this.

With the cradle back in place, it's now time for you to put your A600 back together. Gently position the keyboard on top of the lower casing so that it looks like Picture E. Make sure that you also reconnect the keyboard power connector with the black wire at the right-hand side.

BACK TOGETHER AGAIN

Now put the two parts of the case back together, and snap the clips at the rear, left and right back in place.

Be careful not to trap the keyboard cable outside the box by accident – it's quite easy to do! If the case doesn't fit back together easily, then don't force it – check to make sure that you haven't got anything trapped somewhere inside. When the casing has clipped back into place, turn your A600 upside down again, and put the four screws back in. It's just like doing Step 1 again, only this time in reverse.

Having totally re-assembled your A600, turn it the right way up again, and reconnect the mouse, video, and power connectors. If you have any other peripherals, don't plug them in just yet. You are now all ready to switch on.

STEP 5 SWITCHING ON AGAIN

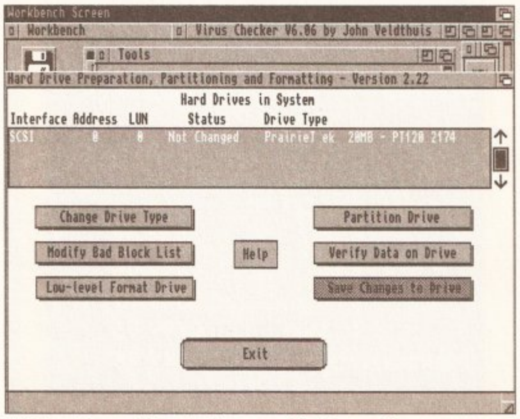
Take a deep breath – the moment of truth is at hand. First switch on your monitor or TV, and then your computer. If everything has gone according to plan, it should go through the usual reset cycle, and prompt you to insert a Workbench disk as normal. You should notice, however, the noise of the drive accelerating, and a faint noise coming from the A600, sounding rather like a small fan. This is the sound of your brand-new hard drive, and hopefully something you'll become quite accustomed to in the near future.

If you cannot hear this, or your machine is not working, don't panic. Switch everything off, and go back to the start, making sure that you check and double-check everything. If your keyboard isn't working (check by pressing the **[Caps lock]** button) then you did not connect the keyboard properly, as in Step 4.

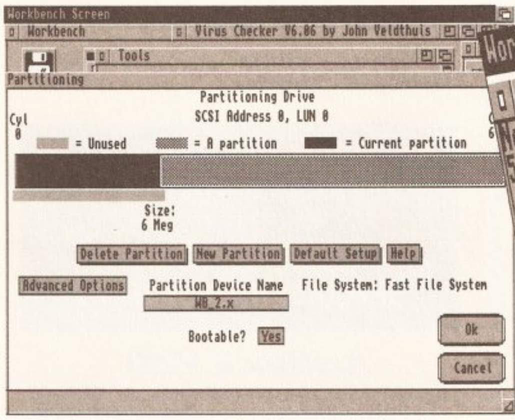
THE LIGHTS ARE ON, BUT NO-ONE'S HOME

Your hard disk light (underneath the floppy one) should also have lit up at some point during the reset procedure. This was your A600 first of all checking the drive and secondly trying to boot from it. It won't have been able to do this, however, as the drive has probably been sold to you blank. Just like an unformatted floppy disk, the computer can't use the hard drive until you have prepared it.

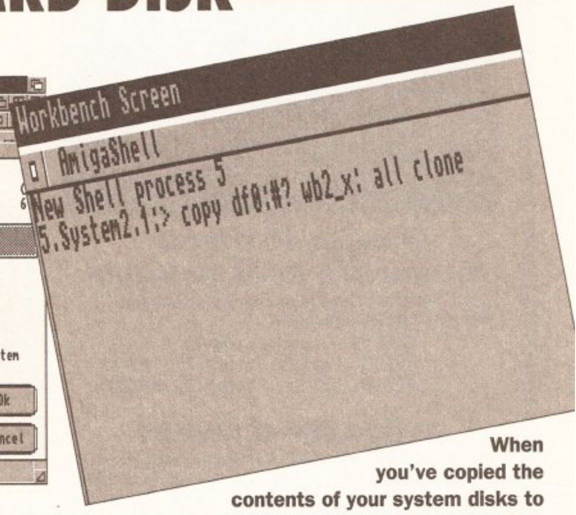
STEP 6 SETTING UP, PARTITIONING AND INSTALLING YOUR HARD DISK



HDToolBox will be indispensable for setting up your hard disk – unless of course the drive was already formatted and partitioned when you bought it



Partitioning your hard disks has all kinds of advantages. It gives you safer and more convenient data storage, especially on large-capacity drives



When you've copied the contents of your system disks to your hard drive, you'll be able to boot straight into Workbench without all the usual hanging around

Boot your computer from your Workbench disk. Once you've arrived at the Workbench prompt, you will need to run *HDToolBox*. Insert the disk with it on in df0:, and run the program. This should look like the picture above. Don't be alarmed by the fact that *HDToolBox* proudly states that you have just installed a SCSI drive into your machine – it's not being entirely truthful. This is a trick by Commodore so that software works properly. The SCSI device software inside your A600 is capable of talking to IDE drives. Click on 'Change Drive Type'. Now, ensuring that 'SCSI' is selected at the top, click on 'Define New Drive Type'. Now click on 'Read Configuration From Drive'. If all is well, the drive light should flicker, and information about the drive is sent to *HDToolBox*. Now that *HDToolBox* knows about your new drive, you are able to partition it.

PART AND PARCEL

It's a good idea at this stage to sit down with a pen and paper, and think about this over a coffee (let's face it – if you've got this far, you deserve a cup!). Partitioning is where you get your large hard drive to pretend to be lots of little ones. There are a number of advantages to this: speed is one, and security is another. If, for example, you accidentally reset while the hard drive is working, then you should only damage data in one partition. Most people have at least two partitions, one holding the Workbench software, and another for all their programs and data. If you have a large drive (more than 20Mb), I would recommend at least three. Use one for the Workbench software of more than 2Mb, and put your Extras, Workbench and other files in there. If you intend to install Workbench 2.1, or 3.0 at a later date, make sure this partition is at least 6Mb in size. Then you could have one called 'Data' for your data files, and one called 'Programs' for all of your applications software. This is just one suggestion – it's worth devoting some thought to this, as it's a real pain to have to re-partition at a later date.

It's not the purpose of this article to be an entire instruction manual for *HDToolBox*, as that should have come with the program. But just to give you a quick outline: having set up your drive as indicated above, go to the 'Partition Drive' part of the program. See the centre picture above for an example of this. Make the first partition Bootable. This is vital. If you forget to do it, then you can't boot from your new hard disk. Name the partitions sensibly. Gone are the days where we called hard disks DH0: and DH1:. We can be more imaginative, and call them names that mean something, like 'Programs:' and 'Work:'. Once this is done, select 'Save Changes to Drive' from *HDToolBox's* main menu. The program will ask you to confirm, and the partitioning information is then written to the hard disk. Now, click on 'Exit'. If *HDToolBox* does not reset your A600 for you, do it yourself, and then boot from your Workbench disk again.

This time, you should see some additional icons on your Workbench screen, one for each partition. These are not formatted yet, and probably appear as 'BAD'. Select your first partition, and format it as you would a floppy drive, making sure that you format it as 'fast file system'. This will take some time. Once this is done, repeat it for every one of your partitions.

ALL SYSTEMS GO

You are now ready to install your System software. Without Commodore's official Install disk, this is a bit laborious, but it is still a straightforward affair that requires a little knowledge of the Shell.

Get all your disks together. By this I mean your Workbench disk, Extras and other disks that came with your A600 (except games of course!). Open up a shell, and type:

```
copy df0:#? wb2: all clone
```

Replace wb2: with the name of your system partition. Now press **[Return]**, and all the contents of df0: (your Workbench disk) will now be copied to the hard disk. This should look rather like the right-hand picture above. When this has finished, remove your Workbench disk, wait a few seconds and then reset your machine – this time, without a disk in the drive.

If you've done everything correctly, your hard disk light should flicker rapidly, and soon you should be looking at the Workbench screen.

If you've got this far, pat yourself on the back: you're very clever! Now, you have to repeat the procedure with all of your other system software disks in order to copy your tools and other items across onto the hard disk. This won't take too long. Now you're in a position to start installing all your own personal software. I strongly recommend that you keep your own programs out of the Workbench partition, and in your own section where they belong. This makes upgrades to new operating systems that little bit easier in the future. With Workbench 2.1 just around the corner, and Workbench 3 upgrades also likely soon, it's worth keeping this in mind.

EVERYTHING'S JUST FINE

All being well, you now have yourself an A600 or A1200 with a hard disk and everything is working as it should. If you have problems, then it's best to consult your local dealer – although you may have to pay if you have caused any damage to the computer. We can't enter into detailed correspondence with individuals about the procedure, as it would take too much time. But, if you're in a real fix, then write to the *Amiga Shopper Answers* panel, and we'll try and sort out the problem right here in the pages of the magazine, where everyone can benefit from it.

GETTING THE RIGHT SOFTWARE TOOLS

Those of you wondering how you can get hold of Commodore's hard disk installation software will be pleased to learn that the company has released version 2.1 of the operating system as an upgrade.

Without the ROM (not needed if you have Kickstart 37.3 or higher), it costs £55 and contains Commodore's *HDToolbox* and *Install* software.

STEP 7 A LITTLE ADVICE ON YOUR A600HD

Most of this is fairly obvious, but I'll go through it briefly nevertheless. I hate to say it, but most of you will eventually be victims of a hard disk error, either caused by a software crash, or by you resetting your machine at the wrong time. There are two types of hard disk user: 'User A' backs up all their data, and so an error like this is just a minor inconvenience. But 'User B' is very upset and swears a lot because he or she has no backups. There is a moral to this story – back up your data or you will be sorry! It's a good idea to buy a proper hard disk backup program, such as *AmiBack 2.0* or *QuarterBack 5.0*. Both of these programs are excellent and very reliable. They don't cost too much, around £30-40. Either will give you a suitable helping of peace of mind, safe in the knowledge that your data is backed up securely. Or, of course, you could use Kwikbackup – on this month's cover disk!

It's good backup procedure to have two backups, to keep them in separate places, and to alternate between the two. This way, if something goes wrong while you are backing up, then you aren't left with no reserve copies whatsoever.

Also, you should try and keep your hard disk organised, neat and tidy. Finding something you want in a drawer full of floppy disks is bad enough – it's even worse on a nearly-full 120Mb hard disk when you don't know where to start.

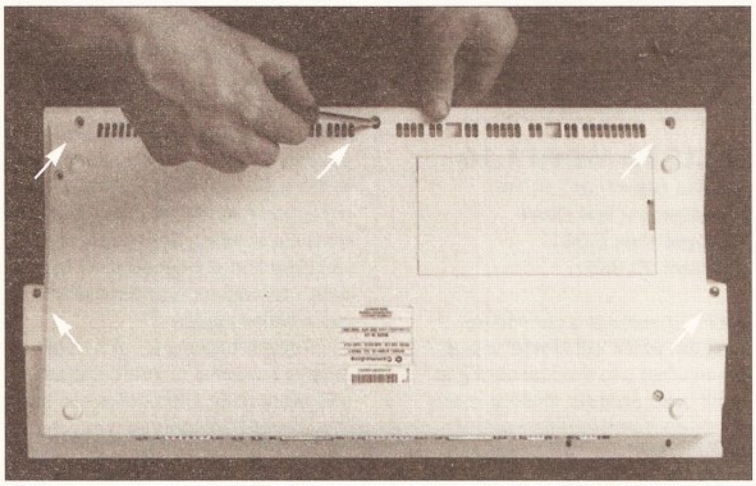
HDToolBox has a verify data on drive option. This checks every single block on your hard disk for errors and reports them if it finds any. It's a good idea to do this once in a while – every month or so should be more than enough. If you take care of it, your hard disk will certainly out-last your A600.

Hard disks are delicate, and don't respond well to knocks and bashes. Although you're not probably in the habit of throwing your computer at walls, bear this in mind.

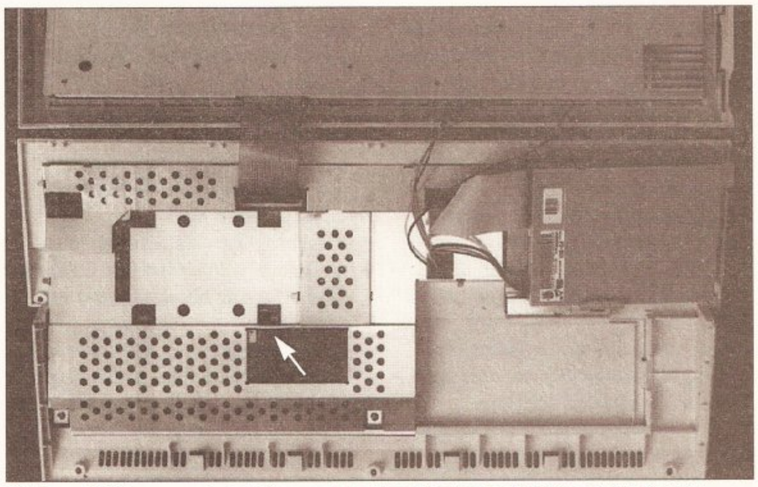
One final thing: with your hard drive installed, you will find that suddenly you have less memory available from the Workbench than before. This is because your new hard disk takes up a certain amount of memory in order to work. So, if you have an unexpanded A600, you might find yourself running very short indeed. Fortunately, you can use the 'early boot' menu (obtained by holding both mouse buttons down when you reset) to disable your hard disk if you want to use floppy software that needs more memory.

I recommend that if you only have 1Mb, you should install a little more. Commodore's A601 costs very little and fits in the trapdoor slot underneath your A600 to give you an extra 512K. PCMCIA cards can give you up to 4Mb of additional memory. Several third-party manufacturers sell A600 memory expansions, which are often very cheap (often less than £40, or as low as £25 for 512K).

STEP 8 DOING IT TO THE A1200



Picture F: You have to undo slightly more screws in order to get an A1200 apart, but other than that, the machines are surprisingly similar in design



Picture G: It's very straightforward to identify the hard drive cradle inside the A1200 – it's one of the few internal components you can get at easily

So! You have an A1200. You are a lucky person. Unfortunately, you also have Workbench 3 on floppy disks, which is a slow experience to say the least. Adding a hard drive to your A1200 makes an incredible difference. The good news about adding a hard drive to the A1200 is that you don't have to worry about Kickstart versions, as A600 owners do, since the A1200 comes complete with a ROM which can work with hard drives straight away. You still need to get hold of *HDToolBox*, however, in order to format your drive. Commodore recommends that you use the special Workbench 3 version of *HDToolBox* on your A1200, as supplied with the A4000 computer. Having said this, in our tests the A600 version worked just fine. If you're worried about this, contact Commodore direct and ask about getting hold of the Workbench 3 hard disk installation disk.

The instructions for installing a drive in the A1200 are much the same as those for the A600. The two photographs above will help you to identify the differences between the A600 and A1200. Photo F shows the various screws you will have to undo on your A1200 to take it apart, and Picture G shows where the hard drive is mounted.

For some reason the A1200 is slightly more fussy about drives than the A600, and also requires a little handiwork inside *HDToolBox*. You will need to set the 'MaxTransfer' rate to, at most, '0x20000' with most drives. Some drives are known not to work properly. You should steer clear of the following, as they have been tested and have shown some unreliability problems on the A1200 (though they work fine on the A600). If you're still not sure, buy a drive from an Amiga dealer, such as one that advertises in *Amiga Shopper*. They will be able to recommend drives that are known to work.

30Mb Conner CP2034
40Mb Quantum GO! Drive 4080
60Mb Conner CP2064
80Mb Conner CP2084

For those who are particularly interested, the reason for these problems is that the Amiga is more powerful than the PC. There – you knew that already! More specifically, the Amiga uses advanced features of IDE drives that PCs don't, and this reveals bugs and errors inside the hard drives themselves.

Once you have installed a hard disk inside your A1200, you will have to install your software in much the same way as the A600, only there are more disks this time. What you really need is the Workbench 3 Hard Disk Install disk, although this isn't available separately. Pester your dealer, or Commodore, (or both) to get hold of this disk. AS

GETTING AT THE PROGRAMS

This disk is not autobooting. What this means is that you must load up Workbench first and open a Shell before you can make any use of its contents. The reason for this is that it saves space, and therefore allows us to pack more information onto the disk.

If you're running on a system without a hard drive or a second floppy, then you'd be advised to copy a few things into your RAM: drive before continuing. Doing so will ensure you have to swap disks as seldom as possible. Type the following at the Shell prompt (with your Workbench disk still in df0:):

```
copy c:copy ram:
copy c:dir ram:
```

Now, whether or not you have a second drive, insert the cover disk and type:

```
copy AS_Shareware_VolII: ↵
c/lha ram:
```

Many of the programs on the cover disk are archived. Archiving is a method of grouping several related files together into one large file. It also compresses these files so that they take up less space. The disadvantage of this method is that you need to use a de-archiving program on the files of interest before you can use them.

The archiver supplied in the **c** directory of the cover disk is *LhA*, a very powerful one. Full documentation for its use can be found in the *LhA* archive, held within the disk's **utilities** directory.

Before you unarchive anything, you have to decide where you are going to put it. If you have plenty of memory to spare, then there's no problem: simply unarchive everything to the RAM disk. If you have a hard disk then again you'll find life easier – you can unarchive everything to this. If neither of the above apply, you'll have to format another floppy disk ready to receive the programs. Bear in mind that you won't be able to fit all of the programs onto one floppy, so you will have to have several standing by.

Once you have found an archive of interest, then the procedure for getting at the programs it holds is simple. The command **lha** is used, followed by a switch which is a shorthand way of telling it that you want it to de-compress information. After this comes the name and location of the archive you want, followed by the place where the archiver is to put the de-compressed files. Supposing that you wanted to take a look at the *Virus Checker* program, then the line to type into the Shell would be as follows:

```
lha x as_shareware_↵
volii:utilities/ ↵
vc620.lha MyDisk:
```

The **vc620.lha** should be replaced by the name of the archive you are interested in. All of the archives have '.lha' at the end of their name. Other programs are ready to use as is. The final part of the command, **MyDisk:**, is the location that you want the un-compressed files to end up in. In this case it is the name of a floppy disk that you have already formatted. The name can be anything you like, but it's best to avoid including spaces.

If you were de-archiving to your RAM disk then you would replace the name of the disk with the word **ram:**. Similarly hard disk users should replace it with the name of a partition, such as **dh0:**.

Once you've performed this process, you'll find (using the **dir** command) that just about every archive contains, aside from the utility program itself, a documentation file, usually called **readme** or with a filename ending in **.doc**. This can be read with a text editor or text display program. With the above example, assuming you had de-archived onto a disk called **MyDisk:**, you would be able to read the program's documentation by typing the following:

```
more MyDisk:virus_↵
checker.doc
```

Instead of the **more** command you may prefer to use **ed** or the name of your favourite editor. Either way, you'll find that you'll have to do some disk swapping so that AmigaDOS can find the text program in question. It's a good idea to read these documentation files: that way you can be sure of getting the most out of the programs on the disk.

As far as the rest of the programs on the disk go, you'll find that they are ready to use immediately. Alternatively, for convenience you may wish to copy them to another work disk using the AmigaDOS **copy** command.

Welcome to *Volume Two* of our Amiga shareware collection. Not only does this one contain some amazing shareware and public domain utilities, including a valuable hard disk back-up program, but also a complete assembler package and listings from just about every programming column in the magazine. For instructions on how to retrieve the programs from their special archived format, please read the panel to the left. Now for a run-down on those superb utilities:

ALERT

All Workbenches
Full size: 9,840

Alert is a handy tool for programmers. It converts Guru numbers (long and difficult-to-understand error codes given by the system when a program has crashed) into meaningful messages which should help you track down any errors in your program.

The program is run from the Shell or CLI. If it's in your current directory or your **c** directory, then you can use it by typing:

```
alert XXXXXXXX
```

where 'XXXXXXXX' represents the Guru number in hexadecimal, just as it is displayed in the flashing message (note that the section of interest is the part of the message to the left of the full stop).

CYCLE TO MENU 1.10

Archive name: ctm110.lha
Workbench 2 and above
Archived size: 6,047
Full size: 10,865

Cycle To Menu is a commodity program which will create pop-up menus that use the standard gad-tools cycle gadgets, making menu selections even easier than they already are.

To use the program, simply drag its icon (once it has been unarchived, of course) into the **WBStartup** drawer.

KWIKBACKUP

Archive name: kwikbackup.lha
All Workbenches
Archived size: 22,528
Full size: 61,437

Kwikbackup is a very handy program that those of you following the hard disk installation article on page 14, or indeed any of you with hard disks, would be well advised to use.

It enables you to make a complete backup of all the information on your hard disk onto a group of floppies. Once you've grown used to a hard disk, you soon come to think of it as being immortal. This impression continues until the day it crashes, at which time you realise you have lost a great deal of valuable data – as well as programs which you have no copies of.

Regular backing up of a hard drive is essential to guard against this eventuality. Hard disks don't fail

STOP!

Before going any further you should make a copy of your disk. All further work should then be done with this copy. Then, if the disk somehow gets damaged, you can refer back to your original.

To make a copy, first move the write-protect tab on your cover disk (the small black square on the top right of the disk) so that the hole it

DISK CONTENTS

The *Amiga Shopper Shareware Collection Volume Two* holds a number of useful utilities which are detailed in the main text.

Their names are:

- **alert**
- **ctm110.lha**
- **kwikbackup.lha**
- **lha138.lha**
- **rqtls21.lha**
- **snoopdos17.lha**
- **vc620.lha**

These can all be found in the **utilities** directory of the disk.

We've also included a complete assembly language development package, along with a couple of example programs to get you started. It is stored in a directory called **assembler** and details of how to use it can be found on page 24.

The rest of the disk is taken up with source code from within the magazine. These program files are as follows:

- **Chaos –** in the directory called **chaos** are two programs, one called **chaos.ambas** and one called **chaos.ascii**. Both are the Julia set generator listed on page 88. The first can be loaded directly into Amiga BASIC, the second will be of use after small modifications with other versions of BASIC.
- **AMOS –** in the directory of the same name is a program called

covers is revealed. This means that nothing can be written to the disk, and nothing can be deleted from it.

Next, open a Shell or CLI window from your Workbench disk. Now type the following:

```
diskcopy from df0: to df0:
```

You may modify this line if you have more than one floppy drive. You will be asked to insert the 'source' disk – this is the cover disk. After you do so, the Amiga will read some of the information from it. Then you'll be asked to insert the destination disk. This is the disk that is to become your copy. Insert a spare disk and wait for the Amiga to write to it. You'll soon be asked to replace the 'source' disk. The process of swapping disks will repeat a few times before the entire disk has been copied. Once it has, make sure you put your original away somewhere safe.

If you find that your cover disk is corrupt, please return it, with an SAE, to Discopy Labs, Unit 2+3, Amiga, Technology Centre, Drayton Fields, Drayton NN11 FR1.

disk or modem much easier. Brief instructions for using *LhA* can be found in the 'Getting at the programs' panel; full instructions are contained within its own archive.

REQTOOLS 2.1

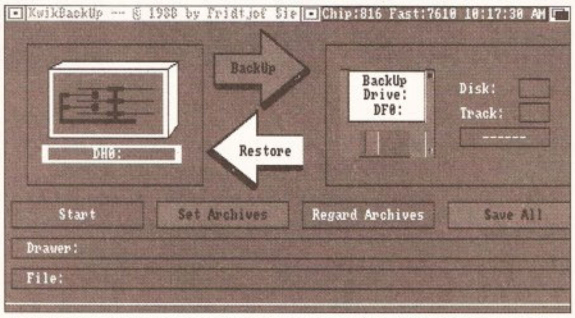
Archive name: rqtls21.lha
Workbench 1.3 and above
Archived size: 308,437
Full size: 698,365

ReqTools simplifies the building of standard requesters during the writing of applications programs, and as such means that the programmer can spend more time on the essentials of his or her

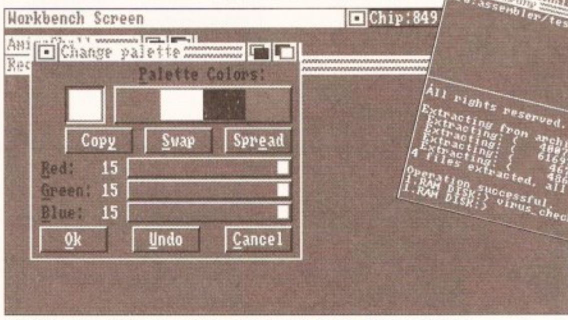
All Workbenches
Archived size: 37,565
Full size: 95,360

SnoopDOS will give information on any AmigaDOS function calls made by currently running applications programs. It's handy for sussing out why programs won't work properly. Often they are looking for other files or programs that they can't find. *SnoopDOS* will tell you what they're looking for.

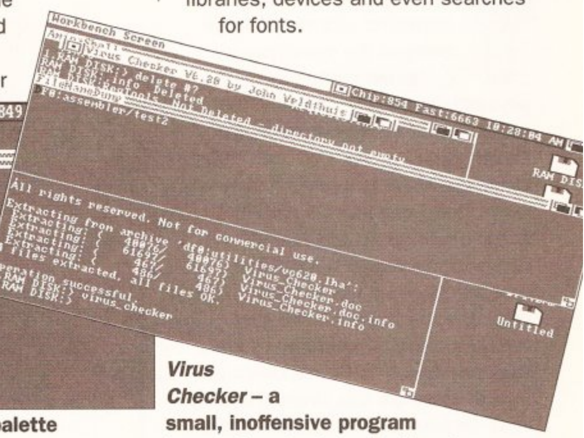
It will tell you about AmigaDOS function calls, as well as calls to libraries, devices and even searches for fonts.



Avoid those hard disk failure blues with *Kwikbackup*. It's easy to use, and it could be a life-saver



Shown is just one of the requesters – the palette requester – that *ReqTools* supplies



***Virus Checker* – a small, inoffensive program to guard against small, offensive ones**

The Amiga Shopper Shareware Collection Volume Two



Read on to find out exactly how to get at all those wonderful programs packed onto this month's disk

scrpack.amos. This is the screen packing program, listed on page 77 of the *AMOS* column.

- AmigaDOS – in this directory you will find an archive (see 'Getting at the programs' for details) containing some of the best AmigaDOS scripts from Mark Smiddy's *Cracking The Shell* series: **error** (see page 86), **error.s** (source code for **error**), **fail** (see page 86), **fail.s** (source code for **fail**), **gensum.rexx**, **hexcon.rexx**, **hexify**, **istoo**, **istoo.s**, **compress**, **uncompress** (see page 90 of Issues 19 and 20 for details of these programs), **warn** (see page 86), and **warn.s** (source code for **warn**).
- **CProgging** – the three example programs used in the C Programming column starting on page 114. They are called **program1.c**, **program2.c** and **program3.c**.

very often, but they certainly *do* fail. Using *Kwikbackup* will take some of the pain out of the laborious process of making backups.

LHA 1.38

Archive name: lha138.lha
All Workbenches
Archived size: 102,399
Full size: 240,262

This is the latest version of Stefan Boberg's immensely versatile archiving program. We've included an unarchived version of the program itself on the disk's **c** directory so that you can get at all the other programs, but this archive contains the complete thing.

An archiver is used to collect together lots of related files into one single file, which is then compressed to save space. It makes the process of transferring information via floppy

program rather than worrying too much about the user interface.

The utility can be used with a variety of programming languages and compilers. It provides a multitude of requester types.

Also, by following the instructions contained in the **RTpatch** directory, any user can install the *RTpatch* program. This means that any programs they run use the more attractive requesters of *ReqTools* rather than the standard ones.

SNOOPDOS 1.7

Archive name: snoopdos17.lha

VIRUS CHECKER 6.20

Archive name: vc620.lha
All Workbenches
Archived size: 49,443
Full size: 102,726

The latest version of one of the most powerful anti-virus programs.

If you have Workbench 2 or higher, then drag the *Virus Checker* icon into your **WBStartup** drawer. Otherwise copy it to your **c** directory and add the following line to your startup-sequence:

```
c:Virus_Checker
```

AS



USING YOUR ASSEMBLER SYSTEM

On the cover disk you'll find all the files necessary to get started with assembler. They're located in the 'assembler' directory. These, along with the program 'ed' supplied with your Amiga, are all you need for a development system.

You may want to copy them all on to a special floppy disk designated as your assembler work disk, but you can in fact copy

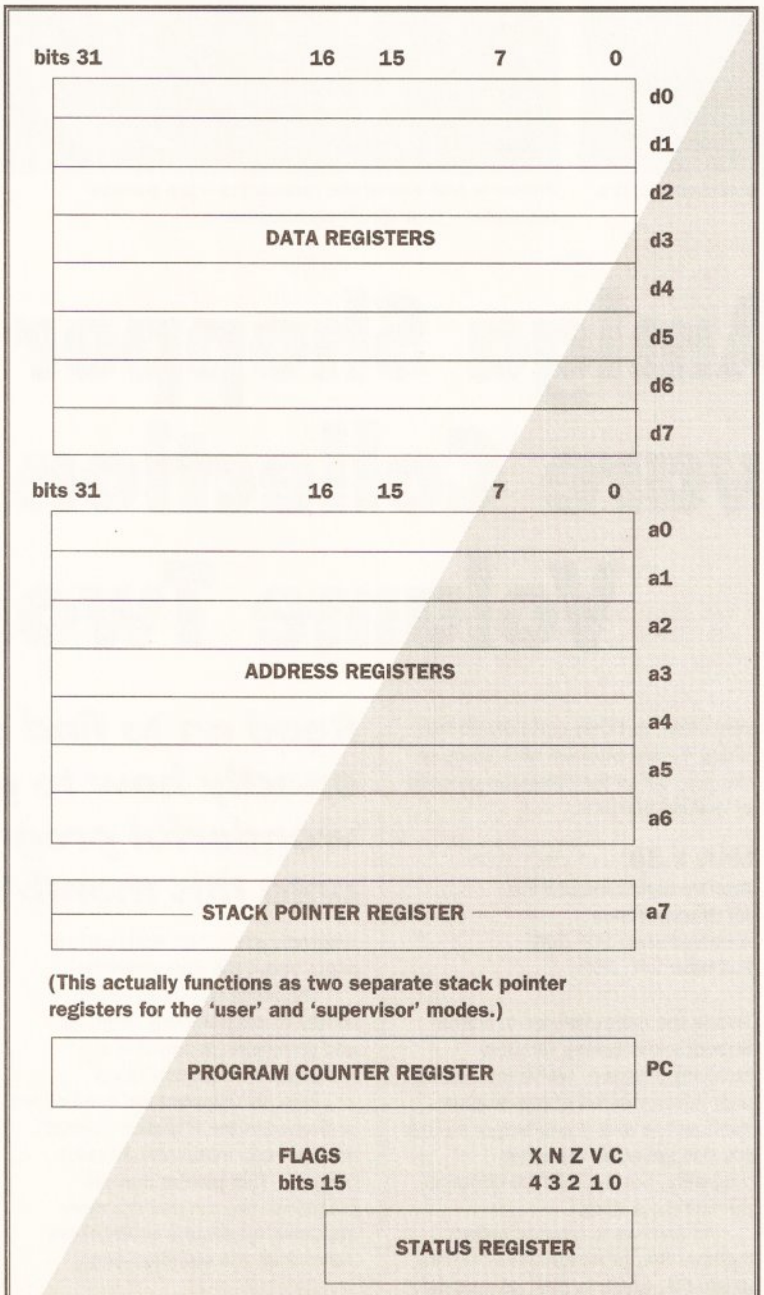
Assemb

This month I've got the chance to answer in detail many of the questions we get about coding in assembly language on the 68000 (or '68K', as we like to call it for short). But first, let's get one thing straight – there is no way in the world that I can provide anything like the full details of the 68000 chip and the Amiga's operating system. To do so would take every page in every issue for the next twelve months. Compromises have therefore had to be made on some topics, although this tutorial should nevertheless provide enough basic explanations to get you started. Perhaps best of all is the fact that since you'll find all the example code, plus Charlie Gibb's *A68K* assembler and the Software Distillery's *Blink* linker on disk, everyone will have everything they need to assemble and run the examples for themselves!

I suppose the first stop in this whirlwind tour should be to explain what an 'assembly language' actually is, so here goes: computers like the Amiga are built around an integrated circuit known as a microprocessor chip. These devices have their own 'instruction set' – a collection of logic and arithmetic instructions, which cause the chip to perform various tasks. At the end of the day it is sets of these instructions, stored in memory, which constitute the 'programs' executed by the computer system.

NUMBERS TO NAMES

The language that the microprocessor understands is based on binary numbers. Given suitable hardware (a processor chip, some memory, some input/output facilities, and all the associated electronic support), one way of programming such a system would be to enter suitable binary numbers directly into system memory and then get the microprocessor to execute the instructions. This 'machine code' programming approach was used to create and run programs in the early days of computing. However, it was a far from ideal way of programming



A schematic model of the registers in the 68000 microprocessor

because the numbers representing particular processor instructions didn't have any obvious connection with the instruction being performed.

The solution was to give the instructions meaningful names (well, as meaningful as possible) – names like ADD, MOVE, SUB and so on. Since these instruction names helped programmers to remember the purpose of the underlying processor instructions, they were called mnemonics. The next step was to automate the process of converting mnemonics back to the numbers which represented the actual processor instructions. Translation programs effectively

> ***"learning an assembly language is not in itself a difficult task"***

'assembled' the runnable program from the mnemonic instructions, so they were called 'assemblers'. And that is how assembly language programming was born!

Over the years microprocessors and development software have become more sophisticated, but these assembly languages (each microprocessor has its own) are always close to the actual machine and its underlying hardware. It is for this reason that you may hear them referred to as 'low-level' languages. Since the Amiga uses the Motorola 68000 chip, it's 68000 assembly language you'll need to learn in order to program the Amiga at the microprocessor level.

Now, learning an assembly language is not in itself a difficult

everything you need to your RAM disk for speedy operation.

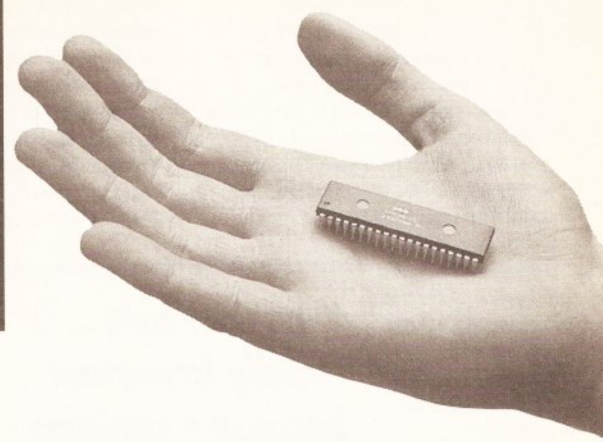
To do this, first boot up with Workbench and open a Shell. Then type the following:

```
copy c:copy ram:
copy c:dir ram:
copy c:ed ram:
copy c:cd ram:
```
(this last line won't be required for Workbench versions 2 and above)

Now insert your cover disk and type:

```
copy as_shareware_volii: ↵
assembler/a68k ram:
copy as_shareware_volii: ↵
assembler/blink ram:
```

You'll also have to copy across the example files you wish to assemble. See page 31 for instructions on how to use them.



ly time

In conjunction with this month's cover disk, Paul Overaa presents an introduction to programming the Amiga in 68000 assembly language. It's faster than BASIC, but nastier than C, and you'll soon be speaking it like a native!

task. But, unfortunately, microprocessors do not work in isolation. On the Amiga the 68000 processor chip is just a small part of a complex system which involves specialist hardware and a very sophisticated covering shell of operating system software too. If you are intent on programming the Amiga using 68000 assembly language then some knowledge of this operating system is needed right from the start. This produces an immediate stumbling block because books which just deal with programming the 68000 do it in an operating-system-independent way, making it difficult for the would-be 68000 Amiga programmer to relate what they are learning about to the Amiga environment. In many ways, newcomers to assembly language (no matter how enthusiastic they might be) have been left high and dry in this area – the purpose of this tutorial is to try and put some of these omissions right.

MAKING A START

All that is needed to start assembler programming on the Amiga is a simple conceptual model of the processor and its facilities. Understanding about how the hardware works (for instance, how the processor physically communicates with memory and the outside world) is almost irrelevant. So, first of all, let's build up a picture of the 68000 chip...

All microprocessors have a number of registers – places where they can store data. The 68000's internal registers are split into two basic groups, address registers and data registers. Each group's registers are numbered from 0 to 7. Data registers are therefore labelled as d0, d1, d2... d7 (or D1, D2... and so on), while the address registers are labelled as a0 (or A0) up to a7.

Address register a7 has a special purpose, in that it serves as the microprocessor's stack register. This means that it is set up to point to an area of memory that is used to store information on a last-in-first-out basis. There are in fact two different 68000 stack pointers – this stems from the fact that the processor can operate in two modes: 'user mode' and 'supervisor mode'. Since it is convenient for each mode to have its own stack, the 68000 has been designed so that register a7 (which can also be referred to by the mnemonic 'sp') behaves like two separate registers, storing both a user mode stack pointer and a supervisor mode stack pointer.

Each 68000 register can hold a 4-byte (32-bit) number. Among its other facilities, the processor is able to move these numbers between its internal registers, or between a register and a memory location (and vice versa). The 68000 can also move 'external' data held in memory from one location to another.

TABLE OF CONTENTS

One of the most distinctive features of the 68000 is the flexibility of its registers. Although they can hold 32-bit (or 'long word') values, the processor can use the address registers to work with 16-bit values ('words') for many operations, while the data registers can in fact work with either 32-bit, 16-bit or 8-bit values. Similarly, there are few restrictions on what you can, or cannot, use the contents of these registers for. If, say, you wish to copy the contents of a data register into an address register, the 68000 will let you do it.

> **"execution... can jump from one part of the program to another"**

Having said that, it is usually better to use address registers for storing and working with memory addresses and data registers for data-orientated operations, simply because each of the groups are better suited to their design-chosen purposes. When working with instructions that may involve byte, word or long word values it is often necessary for the assembly language programmer to identify the size that should be assigned to a given value (the 68000 mnemonic conventions work by placing '.b', '.w' or '.l' after the particular instructions).

Because of its internal architecture, the 68000 does have a limitation on the address values that it uses when accessing word or long word addresses – the address must be 'word aligned' (or, in other words, it must be an even number). Assemblers take care of much of the word-alignment problems automatically, which means that if, for example, you set aside space for a long word variable, the assembler will usually ensure that it gets allocated an even address.

The 68000 also contains a 32-bit program counter which is a register used by the microprocessor to determine the address of the next instruction to be executed. Under normal conditions the program counter is automatically incremented as instructions are read and acted upon, and so instructions contained in memory are executed in sequence, one after another. However, an important part of microprocessor programming revolves around a number of instructions which can alter the contents of the program counter and this has far reaching implications.

By changing the program counter address it is possible to cause the microprocessor to get its next instruction from anywhere in memory (as opposed to just getting the next instruction in memory). The result is that the execution of the program can 'jump' from one part of the program to another. The fact that these jumps can be made conditional on the state of various processor flags means that the processor can make 'intelligent' flow control decisions based on the data with which it is working. A program might, for instance, compare two numbers and, on the basis of the result, execute (or not execute) a particular set of instructions.

Another important 68000 register is the 'status' register. This is divided into two 8-bit registers,

known as the system byte and the user byte. The system byte is only accessible in supervisor mode and contains a number of system related 'bitfields' (such as interrupt masks) which we will not be concerned with here. The user byte, on the other hand, is vitally important because it contains the flag bits whose values are set and cleared according to the results of particular instructions.

> "The user byte... is vitally important because it contains the flag bits"

Five flags are available, providing single bit true-or-false detection of the processor conditions known as carry (C), overflow (V), zero (Z), negative (N), and extend (X). The carry bit holds the carry result from the most significant bit produced by bit-shifting or arithmetic operations, although like many processors the 68000 inverts the carry bit after subtraction. The zero flag is set high (that is, set to 1) when an operation produces a zero result – if, for example, the result of subtracting one number from another produced a zero, then the 68000's zero flag would be set to 1. The negative bit (sometimes called the sign bit) always takes the value of the most significant bit of the result. And finally, the 68000's overflow and extend flags are used primarily for arithmetic applications.

Now, for the 68000 processor to do anything useful it needs to collect data from somewhere, manipulate it, and make the results available to the outside world. From the processor's viewpoint, this 'outside world' includes the RAM and ROM memory chips which form part of the computer system. Most processor instructions work on a piece of data (called the 'operand'), so obviously this data not only has to be stored somewhere but the processor also needs to know where it is stored and how to access it. Many instructions will use some real or implied source address, do something, and then transfer the result to its destination address. It is a set of inbuilt 'addressing modes' which enable these source and destination addresses to be specified.

With the 68000 there are eleven basic addressing schemes and for the sake of completeness here are their names: inherent, register, immediate, absolute, address register indirect, address register indirect with displacement, address register indirect with postincrement, address register indirect with predecrement, address register indirect with index and displacement, program counter relative with displacement, and program counter relative with index and displacement.

Inherent addressing means that the instruction itself implies the location of the operand. Register addressing implies that the operand resides in one of the 68000's internal registers. Absolute addressing means that the address of the operand is located just after the instruction in memory, whereas immediate addressing implies that the operand itself is located just after the instruction in memory.

Indirect addressing is a very powerful concept – on the 68000 a variant called register indirect addressing is used. In short, something called an 'address register' is used to specify the address of the operand. In addition to these straightforward addressing modes, it is possible to specify displacements and to auto-increment or auto-decrement an address by 1,2, or 4 bytes.

LISTING 1 • LISTING 1

Listing 1: A typical piece of 68000 code has four main fields.

```
OPEN_DOS: lea      dos_name,a1          place library name in a1
          move.l   #0,d0                any version will do
          CALLSYS  OpenLibrary,_SysBase  macro (see later)
          move.l   d0,_DOSBase           store returned value
          beq      EXIT                 quit if call failed
```

INSTRUCTION CLASSES

The 68000 instruction set is large and almost all sensible addressing modes can be used with any instruction. Again there's no way we can talk about, or even just list, each instruction – so here is a very brief outline of the type of things the 68000 can do:

● Data movement

The 68000 has a large number of instructions for the transfer of data to and from memory and/or the 68000 microprocessor's internal registers. For example:

```
move.b d1, d2
```

transfers the lower 8 bits of data from register d1 to register d2. This is an example of register addressing.

On the other hand:

```
move.l #0, d2
```

places a zero value in register d2. The hash # sign indicates an operand source addressing mode known as 'immediate' addressing – in terms of the final 68000 instruction this means that the operand (in this case a 32-bit zero value) is stored immediately after the 'move.l' instruction code.

Data can also be moved to memory locations. To move the full 32-bit contents of register d0 to a memory location which has been given the symbolic name '_DOSBase', you would use:

```
move.l d0, _DOSBase
```

Faster move instructions – 'moveq' ('move quick') – are allowed for certain types of data, and a number of specialist instructions are also available. The 'lea' instruction, for instance, can be used to load an address register with a particular operand address. For instance:

```
lea dos_name,a1
```

might be used to load the start address of a string. The string would have been defined using a 'dc.b' (define constant bytes) assembler directive – like this:

```
dos_name dc.b 'dos.library',0
```

The string 'dos.library', plus a terminal null (0) character, would have been placed into part of the program space, and the 'lea' instruction would load the start address (the address of the first byte) of that string into register a1.

> "Assemblers can do far more than translate machine code instructions."

Yet another specialised instruction, 'movem', enables the contents of multiple registers to be moved to (or from) memory with a single instruction.

● Arithmetic and logic instructions

The 68000 supports a standard set of logic and arithmetic operations which allows it to perform addition, subtraction, multiplication and addition. As well as this, it also supports all of the common logic operations (AND, OR, XOR and so on). As an example, the instruction:

```
add.l d0, d1
```

adds the full (32-bit) contents of data register d0 to the contents of register d1.

● Flow control facilities

Without flow control instructions, a processor would only be able to execute program instructions sequentially. The ability to select and execute different parts of a program under different conditions is obviously important, so the 68000, like all other processors, provides a variety of flow control mechanisms.

The 68000 provides both conditional and unconditional branch/jump type instructions for transferring control from one part of a program to another. One such instruction is called 'beq' (Branch on EQual to zero) and this is a flow control branch which is only taken if the 68000's zero flag is set. To use this instruction to conditionally branch to a symbolic address called EXIT, one would write:

```
beq EXIT
```

Unconditional branch/jump instructions are also available, as are subroutine-based branch and jump instructions. These automatically store a 'return' address on the stack mentioned earlier. After a subroutine call has been executed this return address is used to transfer control back to the main part of the program.

● Other instructions

Instructions are provided which allow the 68000 to test, set, and clear individual bits and to rotate and shift operands. There are powerful address calculation instructions, automated loop instructions, and even instructions which allow data areas to be allocated within stack space as subroutine calls are made. A variety of instructions are also available for comparing particular operand values (these set the appropriate status register flags).

PUTTING IT TOGETHER

Assemblers can do far more than translate machine code instructions. A whole range of assembler directives (or 'pseudo-ops') can be used to define symbols, designate areas of memory for data storage, place fixed values in memory and so on. Directives also exist for more mundane operations such as

controlling the listing and error reporting facilities of the assembler. The conventions used vary from assembler to assembler but are always well documented.

The 'EQU' – Equate – directive is a particularly important one. It enables the programmer to define a label with a specific numerical value. For instance:

```
LF EQU 10
```

After the above definition the programmer can use 'LF' (for 'line feed'), instead of the less intuitive real value, 10.

> "The system call, like a great many Amiga system calls, may not succeed"

There are also a range of important storage allocation directives. It is usually possible to specify bytes, words or long word allocations by appending '.b', '.w', or '.l' to a directive. A 'ds' ('define storage') directive will, when written as 'ds.l', allocate space for a number of four-byte (long word) values. So, to reserve four bytes of uninitialised space for a variable called _DOSBase, we could use:

```
_DOSBase ds.l 1
```

Directives will also be available for placing constant values in memory. An example of this is the creation of the 'dos.library' string mentioned earlier.

THAT'S JUST TYPICAL

An assembly language program consists, in the main, of statements which can contain up to four fields: a label, a mnemonic code, operands/addresses, and, last but not least, comments.

Labels are used to identify particular places in the program – in other words, they provide symbolic names which make the program more readable. The mnemonic codes and the operand/address fields are the parts of the instructions we've talked about, and the comments are used to provide in-line program documentation. An example appears in Listing 1, which can be found in the box on the preceding page.

Most of the instructions in this example fragment have already been explained. The first statement, for instance, loads register a1 with the start address of the DOS library name (this name has been stored as part of the program's static data).

The next instruction places a zero in register d0. Now, you may be asking: why is this done? It's an Amiga system convention – we are using an Exec system call called OpenLibrary and this function (documented in books like the Amiga RKM manuals) requires the start of the library name (the address of its first byte) to be in register a1, and the version number to be in register d0. A zero value indicates that we are happy to use any version of this particular library.

The third line, CALLSYS OpenLibrary, is not a 68000 instruction – it is an assembler pseudo-instruction which identifies a group of real instructions known as a 'macro'. In this example, the real instructions would be defined elsewhere and the assembler just inserts them automatically.

The OpenLibrary system call, like a great many Amiga system calls, may not succeed. So, when the program runs two possibilities present themselves:

1. The OpenLibrary call succeeds – in which case register d0 will contain a valid 'base address' for the library (this return value again stems from documented system conventions).

2. The OpenLibrary call fails – here system conventions dictate that on return from such a call, d0 will contain a zero 'failure indicator'.

The program must take account of these eventualities and this is what the example fragment does. The code stores, using a 'move.l' instruction, the contents of d0 in a memory location which has been given the symbolic name _DOSBase. As the data is moved, the zero flag is modified to reflect the value of the data item. A 'beq' (Branch on EQual to zero) instruction is then used to decide whether or not the library was successfully opened. The result of all this branch-based jiggery-pokery is that whether the EXIT branch is taken or not depends on whether the library call was successful at the time the program runs. With the later, runnable examples in this tutorial, I'll be using this same type of scheme to ensure that a library is only closed if it was successfully opened in the first place.

CREATING AN ASSEMBLY LANGUAGE PROGRAM

The first step in writing an assembly language program is to use an editor program to prepare a source code file. This file will simply be an ASCII text file which contains the program instructions that you've written. You will of course be able to list and print the contents of such a file, just as you would a letter or any other piece of stored text. Most commercial assemblers come with their own editor programs, but if you prefer it is also possible to use an alternative editor or word processor program.

The only proviso with the latter option is that it must be possible to prevent the word processor from inserting additional control characters into the text. This is because these characters would as likely as not cause the assembler program to come to a grinding halt as it unsuccessfully tries to interpret them. *ED* and *MEMACS* are two text editors which have been provided as part of the Amiga system software for some time, so all Amiga users should have access to at least these text editors.

Once a source file is available the next step is to get the assembler program to convert it to the appropriate 68000 instructions. We will be using the *A68K* assembler to create a standardised intermediate form known as an object code file. This is not a runnable program – although the object file will include the translated 68000 instruction-related material, the code itself will unfortunately not be in the right format to be loaded by AmigaDOS.

In fact most programs at this stage still contain references to unresolved (unknown) items, such as library routines, or variables that have been specified as being present in other object code modules (such as the start-up code used to allow programs to run from the WorkBench). A third stage, known as 'linking', attempts to fill in the gaps created by these unresolved references. The Amiga linker, *Blink*, is able to combine the various items to produce a runnable program file.

Libraries on the Amiga cause a few headaches for the beginner, primarily because the term is used in a number of different ways. The Amiga's run-time libraries are collections of shared routines that, by virtue of the Amiga's operating system, can be made available to all programs which need them during the times that they are actually running. They are accessed by placing the base address of the library in register a6 and then performing an indirect subroutine call using a displacement value called the Library Vector Offset (or 'LVO').

> "Libraries on the Amiga cause a few headaches for the beginner..."

The libraries I am talking about in the context of the linker discussion are rather different. Linker libraries are sets of pre-written system or utility routines which will be tagged on to the code you write during the linking stage. If you use a linker library function within your program then the linker will automatically find and include the right piece of code in the finished program, providing you correctly specify the name of the library which holds the routine.

LISTING 2 • LISTING 2

```
WRITEDOS MACRO
      movem.l   d1-d3,-(sp)         preserve registers d1-d3
      move.l    \2,d1               DOS output file handle
      move.l    #\1,d2              start of message
      move.l    #\1_SIZEOF,d3       size of message
      CALLSYS   Write,_DOSBase      DOS call to write message
      movem.l   (sp)+,d1-d3         restore registers d1-d3
      ENDM
```

LISTING 3 • LISTING 3

The WRITEDOS macro is expanded like this:

```
   movem.l  d1-d3,-(sp)            preserve registers d1-d3
   move.l   _stdout,d1             DOS output file handle
   move.l   #message,d2            start of message
   move.l   #message_SIZEOF,d3     size of message
   CALLSYS  Write,_DOSBase         DOS call to write message
   movem.l  (sp)+,d1-d3            restore registers d1-d3
```

On occasion things may not go well – you may find that as the assembler attempts to translate your source file it reports any number of errors. Whatever the cause (syntax errors, illegal instructions, or whatever), these faults will have to be corrected. This may mean that, in the early days, you'll pass through the edit/assemble cycle quite a few times before you succeed in creating a program that assembles successfully. Even once you're past that stage of the proceedings, you may then find that the linker reports additional errors (mis-spelling library routine names or not specifying the correct location of library files are commonly-seen linker errors). These errors must also be found and eliminated before a runnable version of the program can be created.

TRY IT FOR YOURSELF

The best way to get to grips with all this mumbo-jumbo is to set up your disk containing *A68K* and *Blink*, then type in, assemble, link, and run some examples that have visible output. The *A68K* and *Blink* usage options themselves are well explained in the associated document files (these are also on the disk) but, for the purposes of my examples, only simple command lines are going to be used.

> **"type in, assemble, link and run some examples that have visible output"**

There is, however, a small problem – we need some example code that is conventional as far as Amiga 68000 programming style is concerned, but which is not dependent on having access to the Amiga include files (which, for copyright reasons, we can't supply). These files provide a lot of 68000 macro support, so to ensure that our code keeps its 'Amiga flavour' we'll have to incorporate some equivalent macro definitions in our own 'include' files. Similarly, we'll have to avoid any dependence on the use of the 'amiga.lib' library because, again for copyright reasons, we are not able to supply the library on disk.

In addition to this there are of course a few self-written macros that can be used to make the example code easier to understand. The bottom line is that before getting to some real examples we need to take a more detailed look into the world of 68000 macro programming.

LISTING 4 • LISTING 4

Listing 4: The CALLSYS macro is itself expanded to give the following.

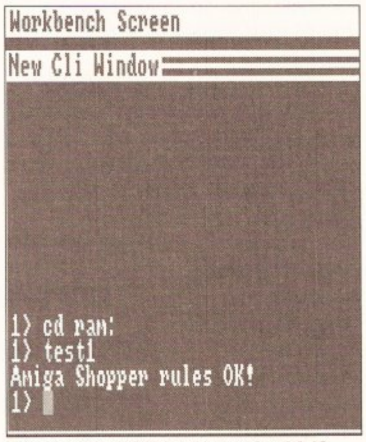
```
movem.l   d1-d3,-(sp)          preserve registers d1-d3
move.l    _stdout,d1           DOS output file handle
move.l    #message,d2          start of message
move.l    #message_SIZEOF,d3   size of message
LINKLIB   _LVOWrite,_DOSBase   DOS call to write message
movem.l   (sp)+,d1-d3          restore registers d1-d3
```

MACRO MAGIC

Motorola-style macro definitions start with a label followed by the 'MACRO' keyword and end with the 'ENDM' keyword (the lower case 'macro' and 'endm' are also accepted). The basic macro format therefore looks something like this:

```
my_macro_name   MACRO
...
<main body of macro code>
...
ENDM
```

Macro parameters are specified using the backslash ('\') character followed by an any alphanumeric character. As an example, the following macro code:



Programs which use standard I/O facilities can help you avoid the initial complexities of Amiga features such as Intuition

```
LINKLIB MACRO
move.l    a6,-(sp)
move.l    \2,a6
jsr       \1(a6)
move.l    (sp)+,a6
ENDM
```

would, if used in conjunction with the following line of a program:

```
LINKLIB _LVODisplayBeep, ↵
_IntuitionBase
```

generate this sequence of instructions:

```
move.l    a6,-(sp)
move.l    _IntuitionBase,a6
jsr       _LVODisplayBeep(a6)
move.l    (sp)+,a6
```

There is incidentally a reserved assembler symbol, NARG, which takes as its value the count of the number of parameters passed. When used in conjunction with the assembler directives IFGT (if greater than) and FAIL it becomes possible to add parameter count error-checking to a macro. For instance, the above example could alternatively be written as:

> **"Writing text... is obviously a useful thing for a program to be able to do"**

```
LINKLIB MACRO
IFGT NARG-2
     FAIL    ;too many ↵
arguments
ENDC
move.l    a6,-(sp)
move.l    \2,a6
jsr       \1(a6)
move.l    (sp)+,a6
ENDM
```

This particular macro is actually already present in the system's 'exec/libraries.i' include file and is used to generate library access code. LINKLIB is the officially-offered macro, but many programmers, for reasons of improved readability, prefer to extend this so that the _LVO prefix is added automatically. We can write a macro to do this job very easily:

```
CALLSYS MACRO
LINKLIB _LVO\1,\2
ENDM
```

If you include this macro in your code, you'll then be able to create the appropriate library opening code using this simplified scheme:

```
CALLSYS OpenLibrary,SysBase
```

So, macros resemble subroutines in the sense that they provide a shorthand reference to a frequently-used set of instructions. However, it should be obvious from the above discussion that macros are not subroutines themselves. The difference between them is as follows. The code for a subroutine will occur only once within a program, and program execution branches to the subroutine. On the other hand, each time a macro is used the assembler will insert a copy of the appropriate instructions (with any parameter-specified alterations).

OUTPUTTING TEXT

Writing text messages back to the CLI/Shell is obviously a useful thing for a program to be able to do and luckily it's not too difficult either. First, you need to identify the standard output handle (a value used to represent the CLI/Shell output stream). There is a DOS function called 'Output()' that can retrieve this data for us – once the handle is available, another general DOS function, called 'Write()', can be used to send data to the specified stream. The full specification for Write() looks like this:

Function Name: Write()

Description: Writes data to a file

Call Format: length_written = Write(file, buffer_p, data_length)

Registers: D0, D1, D2, D3

Arguments:

file	file handle
buffer_p	pointer to buffer holding the data
data_length	length of the data

Return Value: length_written, the number of bytes actually written

Notes: A length_written value of –1 will indicate an error.

You'll see from the above description of Write() that the function needs to know how much data is being written. This means that to use Write() to send text messages to the CLI/Shell window you'll need to know how long each text string is. Static program text is usually set up using define byte ('dc.b') assembler directives along the lines of the following:

```
message dc.b 'Amiga Shopper ↵
rules OK!'
```

One way to work out the number of characters is to actually count them – in the above example this is easy enough to do. With larger pieces of text this approach can

becomes tedious and error-prone – there is in fact a far better way of doing the job. You just place an additional label at the end of the text, and then use the EQUate directive to set it to a value based on the current assembler location counter value minus the start of the original string, like this:

```
message          dc.b 'Amiga ↵
Shopper rules OK!'
message_SIZEOF EQU *-message
```

The result is that the assembler automatically sets the second label to the size of the preceding string. I adopt a convention whereby the sizes of all message strings are represented with a label formed by taking the original string label and adding _SIZEOF to it. Why? Well, it is then possible to create a macro that, given the string label, can form the size label automatically. Since Write() uses registers d1-d3 it is useful to preserve those registers on the stack before loading them with the data needed by the DOS call. The macro shown in Listing 2 does this, sets up d1-d3 as indicated earlier (note how my _SIZEOF convention is used to put a string size in d0), makes the DOS call, and then finally re-instates the contents of registers d1-d3.

With this macro available the assembler programmer can create the necessary code by writing a statement like this:

```
WRITEDOS <text_label>, ↵
<dos_handle>
```

In the above text message example the line needed is:

```
WRITEDOS ↵
message,_stdout
```

which gets expanded to the code shown in Listing 3.

Obviously the CALLSYS macro gets expanded in a similar fashion with CALLSYS itself causing the _LVO prefix to be added to the 'Write' label, and generating a further reference to the system LINKLIB macro, as shown in Listing 4. LINKLIB is also expanded so the final code produced by the assembler looks like that shown in Listing 5.

The advantages of this macro-orientated approach are quite clear – three generally-useful macros have allowed us to create all of the above code by simply writing:

```
WRITEDOS message,_stdout
```

Already the macros are doing a good job of hiding the somewhat 'messy' details of the function calls. In effect they are allowing us to write 68000 assembler code at a much higher level than would otherwise have been possible.

THE REALLY GOOD NEWS

Because the Charlie Gibbs *A68K* assembler is a macro assembler, we are able to use all manner of system-defined and user-defined macro goodies in our Amiga programs. In fact, if I take the macro definitions discussed so far and place them in a header file (which I've called 'test1.i'), along with some LVO values needed for the Exec and DOS function calls, then I can create a header file that can be used to devastating effect. I've done this for the first example program and coupled the header to a short piece of code which puts all of the ideas I've been talking about together. The following example opens the DOS library, sets up _stdout, and then prints a message on the screen. It needs no other include files except 'test1.i' (which I've included on the disk along with the program itself), needs no linking with 'amiga.lib', and it doesn't even need to have the standard startup code tagged on by the linker, providing you are going to run it from the CLI/Shell window.

"The advantages of this macro-orientated approach are quite clear"

This means that if you load the program test1.s, the file test1.i, *A68K* and *Blink* into your RAM disk, and make ram: the current directory (using the command 'cd ram:'), then this example can be assembled and linked using these two commands:

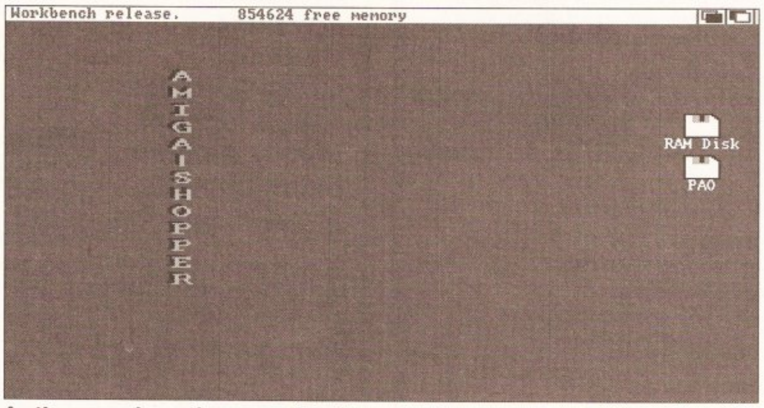
```
a68k test1.s -otest1.o
```

followed by:

```
blink test1.o to test1
```

The result? The assembled, runnable program ('test1') will be sitting in the RAM disk waiting for you to run it!

The Amiga's library arrangements are quite complex, but once you have learnt how to make one library function call, you have essentially learnt how to make any library function call. The scenario is always the same: load up the appropriate registers with the data required by the function, make the function call using the indirect scheme that we've already discussed, and then collect and/or test the results that are returned. The key of course is to have proper documentation for the libraries and their functions – books such as the Addison Wesley *Includes and Autodocs* ROM Kernel Manual are invaluable in this respect.



As the example on the cover disk shows, hardware sprites are also quite easy to use from assembly language – when you know how!

Many of the library functions involve the use of large numbers of inter-related system structures which are defined in the Amiga include files. For this, and a number of other reasons (such as the need to get involved with IDCMP message handling), it is virtually impossible to provide a proper Intuition-based example that can be assembled as easily as our first one. Even opening custom screens and windows requires that you either re-create or use the Amiga header files. The second piece of example code is therefore relatively unambitious, but it does use the DOS and graphics libraries. Also, it should at least show how easy it is to use various functions once the general library-use scenario is understood.

The format of the program 'test2.s' is similar to the previous example, but this time the graphics library is opened as well. Once this has been done, a graphics library call is made to 'GetSprite()'. This function requires the address of the SimpleSprite structure defined in my header file in register a0, while the –1 in register d0 signifies that I want the next available sprite. Either a sprite number will be returned in d0 or, in case of error, a value of –1. Providing a sprite is obtained, I then install the sprite data using a call to 'ChangeSprite()'.

The 'MoveSprite()' function is then used as part of two loops to move the sprite across the screen and back. You'll notice that the DOS 'Delay()' function is used to slow things down. Before closing the libraries and quitting, register d0 is re-loaded with the sprite number and a call made to the graphics library 'FreeSprite()' routine. This just lets the system know that we've finished using it (it can then, if required, re-allocate it).

You will find the source and include file for this example (plus the runnable version) on the disk. As before, it can be assembled and linked using just two commands:

```
a68k test2.s -otest2.o
```

```
blink test2.o to test2
```

Well, that's about it for now. 68000 assembler on the Amiga does take a while to get into, but take it from me – everyone who perseveres gets there in the end. Hopefully tutorials like this help to make some of the initial problems a little easier to get to grips with. Incidentally, as far as the examples go I have (as far as possible) stuck to using instructions similar to the types discussed earlier. However, you should be aware that there are more elegant ways of handling things like loops and so forth – but we'll save those for another time! AS

LISTING 5 • LISTING 5

Listing 5: The final code produced by the macro assembler.

```
movem.l   d1-d3,-(sp)          preserve registers d1-d3
move.l    _stdout,d1           DOS output file handle
move.l    #message,d2          start of message
move.l    #message_SIZEOF,d3   size of message
move.l    a6, -(sp)            preserve contents of a6
move.l    _DOSBase, a6         base address of library
jsr       _LVOWrite(a6)        indirect subroutine call
move.l    (sp)+,a6             restore a6
movem.l   (sp)+,d1-d3          restore registers d1-d3
```

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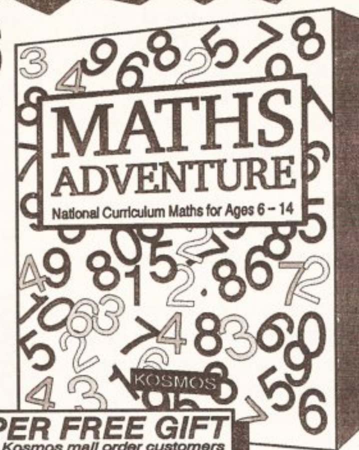
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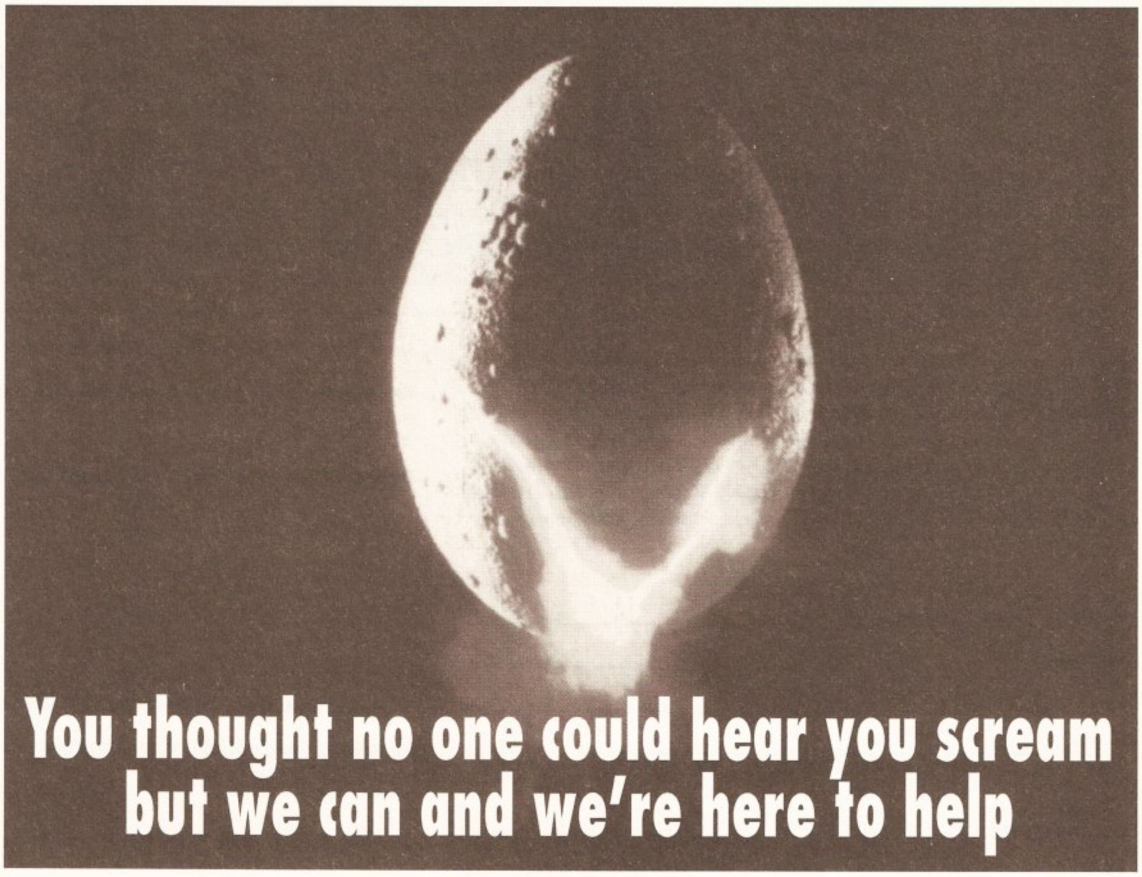
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AS 23

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It's my job to co-ordinate the whole thing: sorting through the questions and sending them off to the relevant chappies for the kind of in-depth answers you've come to expect; and compiling them into the lovingly crafted pages which you see before you.

I call on a variety of expertise to make sure you get the answers you need, which is why *Amiga Answers* is so successful. There's Mark Smiddy, industry guru, AmigaDOS-tamer and business applications wizard; Jeff Walker, probably the most knowledgeable Amiga desktop publisher there is; and Jason Holborn, long-time *AMOS* explorer and PD sampler, as well as good all-rounder (or should that be all round good guy?); and Toby Simpson, lead programmer for Millennium and accelerator expert.

If it's a question about video, I'll pass it on to Gary Whiteley, our professional videographer for whom the word 'genlock' means 'mixing Amiga graphics with video for magical results' and for whom the word 'snipwirral' means nothing.

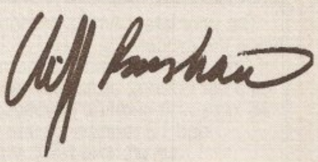
Programming queries are dealt with by Paul Overaa, who's not afraid to code in any language, and who doubles as a MIDI maestro to solve your sequencing slip-ups.

Our hardware guru is Jolyon Ralph. This man knows just about everything about disks, both hard and floppy, and what he doesn't know about memory he's probably forgotten. Communication breakdowns are fixed-up by Dave Winder, while general Amiga queries are dealt with by the indefatigable Wilf Rees – all in all, a formidable team. Let's face it, if we can't answer your question, it's probably one of the Mysteries of the Universe.

Advice on printing scans, installing Workbench's *Fountain* program and using a recoverable RAM drive with a Fatter Agnus are just some of the delights awaiting you in these pages. And don't forget the *Code Clinic*, in which Toby Simpson exterminates your coding bugs.

Keep sending us those problems – the solutions are just around the corner.

Cheers,



PINCHING AN INCH



After buying an Amiga 600 3 months ago I am now looking for an upgrade hard drive. After opening the case of my Amiga to fit a ROM-switcher, I saw that I could easily fit a 3.5-inch hard drive instead of the more expensive 2.5-inch type inside my machine.

a) Could I use the Quantum IMP52AT with my Amiga? If it is incompatible could you recommend some alternative drives?

b) Would the power supply be a problem? I have one extra drive and I'm thinking of getting a RAM expansion (1Mb).

c) I understand that the hard drive would have to be set up before it could be used. Where can I get some installation software? And how would I set it up?

d) I know hard drives are fast, but I'd want it to boot very fast, in about five seconds. I want it to load like Workbench, but after looking at the startup-sequence (about two pages of it), I was left wondering whether it is all necessary? Couldn't I shorten it to just the most important things?

R Longworth
Poulton-le-Fylde
Lancs

Commodore only recommend 2.5-inch hard drives for good reasons. Firstly, only 2.5-inch hard drives can be mounted properly in the Amiga 600, and secondly 2.5-inch hard drives use far less power than their 3.5-inch counterparts. 3.5-inch hard drives need both 5V and 12V power lines, whereas the 2.5-inch drives only require 5V.

Thirdly, 2.5-inch and 3.5-inch drives have different connectors. 2.5-inch drives have a 44-way high-density connector, and 3.5-inch drives have a 40-way data connector and a separate 4-way power connector. Although it could be possible to wire up most lines directly, the absence of a 12V line on the Amiga 600 IDE connector will cause major problems.

If you are going to get an internal hard disk then an extra 1Mb of RAM is essential. Adding the hard drive takes away 200K of Chip RAM which will prevent many 1Mb programs from running.

The software you require to set up your hard drive is *HDToolBox*. This is not sold separately, but if you have a friend with an A600HD, or an Amiga 500 with an A590 hard disk, they may be able to lend you their Hard Disk install disk for a few hours to do the job. Failing that, you could order your hard disk from a company which is able to format and prepare the drive for you before installing. On the general subject of finding and installing IDE hard disks, you're in luck, because this month's cover feature is on this very topic – turn to page 14 to find out more!

With the original 1.3 Workbench, many people changed the startup for their systems, editing the **s:startup-sequence** to add or remove commands. Under 2.04 and above, the **s:startup-sequence** should never be changed. Every line is in there for a reason and removing one line could later cause problems with software that you will find difficult to solve. A new file, **s:user-startup,** is provided for you to add things to, so that the **startup-sequence** file can be replaced when new versions of Workbench are released without disturbing your system. On a hard disk the **startup-sequence** is executed very fast, so do not worry too much about this. ***JR***

FOUNTAIN OF PROBLEMS



Since I have had my Amiga 500 Plus, I have attempted to install *Fountain* numerous times using the methods shown in various magazines. One says copy 'diskfont.library' from Extras or Amigafonts to Workbench but there is insufficient space on the WB disk to do this. I am no computer expert so would be grateful if you could explain from the start how to get this to work.

Mr AD Ormston
Carterton
Oxon

Firstly, to explain in full, *Fountain* is a utility for creating bitmap fonts of any size (like those used with *Dpaint*) from an outline font source, such as a DTP program. It does this by converting an Agfa Compugraphic font into a format that it can utilise. *Fountain* will not work unless it sees a particular version of the **diskfont.library** in the **libs:** directory of your Workbench disk. The correct version of this library lies in the **libs:** directory of your Extras disk. To copy it over, type:

```
Copy Extras2.0:libs/diskfont.↵
library to workbench2.0:libs/
```

JARGON BUSTING • JARGON BUSTING

Font – the group of letters, numbers and special characters that comprise one variation of typeface: 12pt Times, 12pt Times Bold, 12pt Times Italic, and so on. Sometimes (mistakenly) used in desktop publishing to refer to a type family.

RAM – Random Access Memory, so called because any part of it can be accessed immediately, rather than having to search through it from the start of memory to the point of interest. RAM is used to hold programs while they are being executed and temporary data. The contents of RAM are lost when the power is switched off.

Startup-sequence – a program which is executed every time the Amiga is switched on and after every reset. It sets up the system so that it is usable from Workbench, and may be customised by those who have unusual hard or software requirements.

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Put the FONTS: disk in any drive and with a bit of luck, *Fountain* should run normally. ***WR***

WHICH COMPILER?

I've decided to learn C and I would like some advice on which package to buy. After looking at various adverts I've come up with the following sorts of prices:

Lattice C v6	**£179.99**
Lattice C++	**£159.00**
(what's the difference?)	
Aztec C Developer	**£124.95**
Aztec C Professional	**£134.95**

Which do you recommend? Are there any other C compilers that are better? By the way – would you do a regular assembler column?

Mark Harris
Kirriemuir

C++ is a 'C-flavoured' object-orientated language. Conceptually, C++ is a very different language from C and you really have to be competent with C before you can even think about learning C++. There's absolutely no doubt that *Lattice/SAS v6* is the package that you should go for – it is absolutely brilliant and, if you are serious about learning C, you'll find it worth every penny of the asking price!

We are getting lots of people asking for help with 68000 coding. So, by public demand, there's a big feature on getting started with assembler starting on page 24 of this issue. ***PAO***

FANTASTIC FOUR

I am considering a major upgrade to the A4000, but there are a few questions I'd like answered first. I have read (in another magazine) that the A4000 comes with a 68EC040, and not the usual 68040. The MMU I can live without (though it would be nice to run *Enforcer*), but the FPU? How easy and expensive would it be to put a real 68040 in it? Can you just switch chips, or do you need to swap boards?

My second question concerns a monitor. I'd obviously need a multisync to get the new modes, but would the old ones work? Your advice please!

Geoff Hackworth
Ruddington
Notts

I'm afraid that you have been misinformed. The A4000 comes with a real 68040, and it has both the FPU and the MMU. The MMU is essential for a number of reasons, one being that it is necessary to get the Commodore A2091 SCSI card to work in the A4000. So you can run *Enforcer*, and do lots of floating point maths! There was originally a chance that CBM would do a cheaper version of the A4000 with the EC040, and the manual describes how to upgrade, I can only assume that this is how the confusion you describe came about.

You do not, strictly speaking require a multisync to display new modes. You only require the multi-sync if you want to display flicker-fixed modes, such as 640 by 512. You can display 256-colour 640 by 256 quite happily on a 1084S. All your old modes will work, however, with a multisync monitor. Please make sure you don't accidentally buy a cheaper VGA only monitor – you need a real multisync on the Amiga, such as the Taxan 775, or Commodore A1960. ***TS***

DOCTOR WHO?

Can you please explain to me how to repair my disks when they become faulty. I already have *Fix Disk*, *Last Hope* and *DiskDoctor*, but all they do is to report errors. What I would like to know is what I am supposed to do with these errors. Could you please explain in very simple terms how to rescue the files on a faulty disk?

Ted Pittaway
Wednesbury
W Midlands

It seems to me that the mistake that you're making is to assume that once a disk has been corrected by *DiskDoctor*, you can carry on using it as if nothing had happened. Don't believe it – *DiskDoctor* (and indeed all the other disk repair programs that you mention) simply attempts to make a faulty disk as usable as possible, allowing you to extract the files that you need. As soon as you run a disk through *DiskDoctor*, you should transfer its contents to another disk and then throw it away. Don't use *Diskcopy*, though – use the AmigaDOS command **Copy df0: df1: all** instead. ***JH***

PAINT TROUBLE

After several months working with *Vista Pro*, *Scenery Animator* and *Real 3D*, I find that various problems have regularly arisen that you might be able to help me with.

The first is that I find it horrendously boring loading *Real 3D* frames (HAM Interlace) into *Deluxe Paint IV* frame by frame to create an animation. The use of 'wildcards' may indeed hold the solution to my problem, but I am unfamiliar with their operation. The word 'pattern' shows up when the *DPaint IV* load requester appears, but I can find no reference to loading sequences of frames without the monotonous task of loading each individual image into successive frames of an animation.

The next problem is that after I've loaded in all the frames they look perfect – until I actually run the anim (using *ShowAnim* from one of Tobias Richter's slideshows) and then I get the most appalling anti-aliasing on all but the first frame. I must point out that this problem is intermittent and I suspect that it may be caused by 'memory fragmentation' – which the *DPaint* manual mentions but doesn't explain – or perhaps the fact that *Vista Pro* uses the two colours from *DPaint's* menus and requesters in its palette.

Thirdly, when using *Vista Pro 2* and *Real 3D*, to my horror the same old requester "Not enough memory" appears – even though I have 4.5Mb of memory on board. Is this caused by lack of Chip RAM and, if it is, why doesn't the program use Fast RAM instead?

My fourth problem is with printing frames rendered by the above programs on my Honeywell Bull A3 colour Proprinter. All the pictures come out very dark even

continued on page 40

WHERE ARE MY TOOLS?

I bought my machine for Christmas and worked through the tutorial (without making a copy of the Workbench). I think I must have altered something because when I try to load something it states: "The icons have no default tool". This is followed by a message: "program Unnamed1 has not returned, should I wait some more?" If I cancel the request Workbench continues as normal – but how can I get rid of the problems? (If they are problems!)

JR White, Bugbrooke, Northampton

First and foremost: never, ever work on your original disks! This is a sure way to cause yourself problems. In my opinion Commodore should supply a set of blank disks with every machine so people won't have an excuse not to back up. That is academic now, but what intrigues me is your address – is there really a place called Bugbrooke?

What I suspect you have done, although I don't have a copy of Workbench 2.05 to try this on, is made a new drawer and dropped it into your **WBStartup** drawer. (When I tried this on Workbench 3 nothing happened, but that could be a bug fix.)

New drawers are always called 'Unnamed#' so that explains the name. Although you didn't specify this in your letter, what you describe only occurs after booting the disk because any programs located in the **WBStartup** drawer are executed. If you had a drawer in there, Workbench 2.05 might assume that was a 'Project' icon and try to execute its default 'tool' – an application program. Since drawers don't have tools attached, that would give rise to the first error: "The icon(s) do not have a default tool".

The second error is also a bug in Workbench. Since it has attempted to start an application (Unnamed1) and not realised that nothing actually happened, it was still waiting around for the program to complete, hence the second error message.

Solution: open your **WBStartup** drawer and drag all the contents out. If there's anything in there you don't want, delete it. Problem solved. In future though, please work on a copy. ***MS***

JARGON BUSTING • JARGON BUSTING

C – a compiled language designed primarily for systems programming. It was used to write much of the Amiga's operating system, and is used in the writing of many Amiga applications.

Compiler – a means of translating a program to render it understandable to the computer. A compiler translates the whole thing into machine code before it is run. The compiled program is generally much faster than its interpreted counterpart.

HAM – HAM (Hold And Modify) is an Amiga graphic mode which allows a maximum of 4,096 colours to be displayed on screen at once, subject to certain restrictions.

SCSI – short for Small Computer Systems Interface, this is the standard used for connecting hard drives, CD-ROM drives and tape back-up units to computers.

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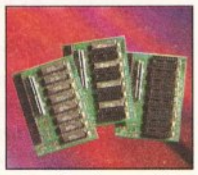
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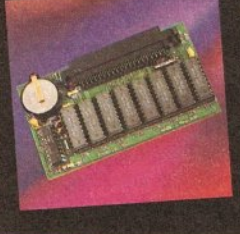
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Simply the Best !

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Powerful image processing tools for the office or the home environment.

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continued from page 37

though I have fiddled around with Preferences. Is there any way I can alter the contrast of an image after it has been rendered by, say, *Vista*, to make it lighter?

Lastly, is there any method of getting more than 40-odd HAM frames of animation onto a 3.5-inch floppy disk. I cannot afford a hard drive at the moment and so my animations must, by necessity, fit onto a disk and still leave room for a method of showing them (such as *ShowAnim*) from self-booting disks.

I use a 1.3WB Amiga 500 with a 4Mb Cortex RAM expansion.

Gareth Arlett
Barnstaple
Devon

The *Deluxe Paint IV* loading problem is easy to solve. If you examine the picture 'Load' requester you'll see the words "# of frames" with a box next to it. After selecting the directory and name of the first picture you wish to load, type in the total number of images you have and press return. *DPaint* will then load the required pictures, making a new animation frame for each one automatically, and when they're all loaded you can play the whole lot back. There are a few rules though. All the pictures must be in an identical resolution and mode (all HAM lo-res, for instance) and one which *DPaint IV* can handle. They must be sequentially named – Test1, Test2...Test42, for example – and naming should preferably follow the *DPaint* convention – Test001, Test002... Test042 – or you'll find that frames will sometimes be loaded out of order. Use *Reverser* (£10 from Alternative Image ☎ 0533 440041) if you need to rename loads of images, though in this case the *Vista* naming convention ('Pic0000x') seems to work OK.

The 'funny colour' problem arises because *Deluxe Paint* cannot handle sequences of images with different colour palettes – the results you describe are indicative of this. You need to make sure that all the images use the same palette – in other words, that the palette is 'locked' after the first frame. If you cannot instruct the rendering software to make this happen automatically, you'll have to adjust each image after rendering. This can be done in *DPaint* but requires a lot of messing around to remap each image to one with a fixed palette. Fortunately, clicking the 'LockP' button in *Vista Pro 2* forces the palette to be locked. There is also an excellent PD program called *Rend24* which can process animations from sequences, lock palettes and more. I think you'd find a copy very handy.

JARGON BUSTING • JARGON BUSTING

Assembler – a program which converts an assembly language program written in words (well, almost) into the machine code numbers that the Amiga's 68000 processor understands. Writing programs in assembly language ensures that the best possible speed and memory efficiency is gained from the machine.

Emulator – a device, either hardware or software, that enables programs written for another machine to be used on the Amiga. The emulator makes the Amiga take on all (or most) of the characteristics of the foreign machine, and is transparent to the programs running under it.

Fatter Agnus – a newer, although now superseded, version of the Amiga's custom chip which deals with graphics. The main difference this chip has over its predecessor is the ability to access 1Mb of Chip RAM instead of 512K.

I'm not certain about your third problem, but I suspect that it is caused by your Amiga only having 0.5Mb of Chip RAM, which is special RAM dedicated to screen display purposes and, as such, cannot be substituted for by Fast RAM (though many of us wish it could).

Although it might only be a quick fix, try painting over your image in *DPaint IV* with a white colour while you have translucency set to something like 80%. I mention this because you already have *DP IV*. But really you should try to find a suitable driver for your printer. Otherwise you'll need some kind of image processing software – you could try *Pixmate* for starters.

Finally, there's no practical way of fitting a quart into a pint pot. A floppy disk will inevitably fill up at some stage and you appear, unfortunately, to have reached that limit. Smaller images and less colours will help, but if you need to run off floppy disk there's little else I can suggest. Any better suggestions gratefully received. ***GW***

ALARMING PEST

In the May 1992 issue of *Amiga Shopper* a DOS batch file was printed called 'The Pest'. Is there any way of setting the alarm on the clock program to coincide with the time shown in the reminder diary? By the way, the *AmigaDOS* section of the mag is really cool.

Simon Eastop
Milford Haven
Pembrokeshire

Unfortunately, there is no way that you could set the alarm on the clock externally, but it would be possible to write a program that works similarly to the Workbench clock, running in the background. This program could monitor the system time until it meets a certain point and then a shell window would open to tell you that it's time for your favourite television programme! ***WR***

FAT LOT OF GOOD?

a) For some time now I have been using a chunk of memory as a recoverable RAM drive but recently I carried out the modification in your magazine to allow Fatter Agnus to access the full 1Mb Chip. Although this modification solved many problems, my recoverable RAM drive no longer boots! Is this just a matter of modifying my startup-sequence?

b) My brother has an Apple Mac Plus and would like to make use of Amiga graphic files. I am looking for a way of reading or writing to Apple Mac disks and also converting IFF files to Mac format. I don't need to run any Mac programs, just transfer the files.

Jonathan Jewell
Frettenham
Norfolk

a) The problem is this: RAD à la 1.3 does not expect to find 1Mb of Chip, so when you reset the machine it falls over. The solution is to modify the first line in your startup-sequence to read:

```
SETPATCH >NIL: -R
```

The –R switch patches the system to expect to find 1Mb of Chip memory. That should fix your problems, although in my experience this fix either works or it doesn't – *c'est la vie!*

b) That's simple enough – we do it all the time. There are several ways around this problem and the most obvious is to buy a specialised piece of software to write to Mac disks – a costly and unnecessary expense. Better still, get your hands on a copy of the PD utility *MultiDOS* (or something similar) to read and write PC disks.

Now get your brother to format some disks to 720K MS-DOS format on his Mac using *Apple File Exchange* (an Apple freebie supplied with most systems). You must not use the high-density (1.44Mb) floppies – they're marked HD and have an extra hole in the case – since your Amiga cannot read them.

What you do next is up to you. You can either convert the Amiga IFFs to a GIF format using something like *TurboGif* or just save the raw IFF to PC disk. Your brother can read the IFF file on his Mac using *Apple File Exchange* (default translation) and convert to a Mac PICT format using something like the PD program *XLateGraf* or from a GIF file using *Giffer* or *Gif Converter*. All this software is readily available from PD libraries or the BBS system CIX.

One word of caution here. Most Mac software – like *XLateGraf* – needs a special 'file creator' header. An all-encompassing one, MDOS, is created automatically by *Apple File Exchange*. Certain PD programs assume if the file creator is not 'IFFf' (note the extra 'F') then the file is likewise, not IFF. Your brother will be able to fix this using something like *Norton Utilities*, *DiskTop* or *ResEdit* to name but three. *Gif Converter* is not affected by this problem since it can interrogate the file directly, but it is shareware and requires around 3Mb of memory. ***MS***

WHAT A GREY DAY!

I enclose two pictures obtained using the *Golden Image* hand scanner on a black-and-white photo. The printer used in both cases was the Hewlett Packard DeskJet 500, with the HP_DeskJet driver.

I find that no matter what adjustments I make, the picture printed with *Wordworth* (and *ProWrite*) nowhere equals that from *Pen Pal*. I imagine that I could improve things and remove the banding by using the *Turboprint Professional* program, but I have had no luck to date.

Can you throw some light on this problem?

SW Waldron
Newport
Gwent

Pen Pal loads the picture and creates a screen image for document formatting purposes, but when it comes to printing time it reads the picture file from disk again in order to print it in the original colours, or shades of grey. *Wordworth 1.1*, on the other hand, loads the picture and then converts it to the number of colours of the current screen mode. When it prints the picture, it prints exactly what is on the screen, so if you loaded it into the document while working in four colours, only black, white and two shades of grey are printed, instead of the full 16.

The *Wordworth* output you sent me looks like it has either been

printed while in two-colour mode, or that you selected B&W output instead of Grey.

If you want *Wordworth* to print better greyscales, then you must load the picture into the document while in 16-colour mode (selecting 'Use Pic's Palette') and also print the document using the Grey setting (not B&W) while in 16-colour mode. ***JW***

BECOMING BILINGUAL



I recently started programming in 68000 Assembler and I am very interested in graphic applications. Could you tell me any good machine code books to buy?

Would it be possible to show me, with a piece of code, how to load files from *DPaint 3* for display on the screen?

I currently own the Abacus *Machine Language* book and have been following the tutorials in *Amiga Format*.

Simon Wareham
Bradley Stoke North
Bristol

I am afraid that there aren't many really good assembly language books for the Amiga that I am currently aware of. The real problem stems from the fact that to program the Amiga well, you also ought to have some knowledge of C. The books for you are the ROM Kernel Manuals, or RKMs. This is where you need your C knowledge, as you'll find that most of the examples and discussions in these books are C-related.

Programming the Amiga badly is very easy to do. The problem with just working through a programmer's guide-type book is that you can pick up a lot of bad programming techniques which will cause serious incompatibility problems on faster processors, and on machines with the AGA chipset. Programming the Amiga well is a lot harder, but it is worth the effort. You do not need to become an expert on C – you just need a basic knowledge. This way you will be able to understand the *Amiga Libraries Reference RKM*, which will tell you all you need for loading up pictures. I'm afraid there isn't enough space to print a program to do what you require, but this is something that's sure to come up in the forthcoming *Amiga Shopper* articles on assembler. Have a look in on the C columns too. ***TS***

INDIRECT ADDRESSING



In the September issue of *Amiga Shopper* a music article mentioned 'Hands-On MIDI Software' but only provided a telephone number rather than a full address. I wish to write to them because my English is not good enough to talk to them by phone so I wonder if you could provide the address for me. I think that all your overseas readers would appreciate that, if you give a telephone number for your English readers, you would also give the full address for the rest of us – thanks.

Jos Van Gasse
Meaksem
Belgium

Point taken, the full address you want is: Hands On Midi Software Ltd, 3 Bell Road, Cosham, Portsmouth, Hampshire PO6 3NX, England.

As luck would have it, the company's telephone number was actually printed wrongly in the September issue – the correct number is 0705 221162. ***PAO***

LOST DRAWERS



As a latecomer to video, and a senior citizen to boot, I sometimes feel that I could do with a 'Hot Line' to someone who can help me solve my video editing problems with my Amiga 500 and *VideoPilot V110* editing system. It's probably a very simple problem, but for the life of me I can't crack it.

As it is necessary to save the equipment configuration to disk, I have followed the instructions, formatted a disk and created three drawers called Config, Edit and Black. These are on a disk I have called 'USA 92 (1)'.

Everything works OK until I choose 'Save' from the pull-down menu and, even after the reassuring sounds of disk activity, a message appears saying "Config not saved", or something similar.

I've enclosed a photograph of the screen *(which shows a fairly standard file requester –GW)* **to help you diagnose my problems. In the requester I would type 'Config', 'Edit' or 'Black' as required for the drawer name and 'USA 92 (1)' for the file name. Am I doing this right? Also, where does the 'parent' bit come in? Also, does 'Directories' mean 'Drawers' in this case, or am I missing something?**

Fortunately, the last edit is always saved to a file called 'screen' for safety, but I'm afraid this isn't sufficient. Please help!

I also suggest that Gary Whiteley tests the *EMR VideoPilot* – it is an amazing outfit.

Joe Derrick
Bristol
Avon

It sounds like the nub of your problem is in distinguishing between drawers, files and disk names. What you should be typing in the Drawer requester is something like **USA 92 (1):Config** and in the File requester the name which you want the file to be called – **FirstCut.config**, say.

To clarify this a little – the first commands refer to your disk **USA 92 (1)** and its drawer, **Config**. Be careful with disk names – one with spaces in it like this could cause trouble with some operations. It is often best to use '_' between words if you need to separate them. Incidentally, you are correct in thinking that 'Drawer' is synonymous with 'Directory'.

Thanks for your suggestion about me checking out the *VideoPilot*, Joe. But I already did – in *AS* Issue 7! ***GW***

WALKING ON WATER



I have a printer driver for my Star LC-200 dot matrix that was recommended by your magazine. My problem is that when I print a picture the detail is not very good.

Is there a better driver, or some other sort of software that will give me better quality pictures? And is there a converter that is able to change HAM pictures into 64, 32, 16 or 8 colours?

Paul Burke
Sheffield
W Midlands

From your second question I'm guessing that you are trying to print digitised or delicately shaded 4096-colour HAM pictures on your 9-pin colour printer, and you're expecting them to come out looking like they do on the screen.

It's not going to happen, Paul, you're asking for miracles. (And I'm afraid the time of year for them has just passed!) Your idea for converting them down to fewer colours is along the right lines, but of course the fewer colours you use, the worse the picture is going to look. Considering your 2Mb set-up, *Deluxe Paint IV* is probably your best bet for converting the pictures. First run *Deluxe Paint* and set the screen up to the resolution and number of colours you require, then load the picture and answer 'No' when asked if you want to change to the picture's screen mode. You will be asked whether you want the picture dithered or not. Your answer to this will depend on the picture – you'll have to experiment to see what looks best.

To get better colour output you should consider buying either *Flexidump*, *Turboprint Professional* or *TruePrint/24*, all programs which will allow you to play with colour correction and dither patterns to get the colours that are printed to look more like those on the screen. But remember that your 9-pin printer is fairly low resolution, and this is always going to be the main reason that the detail is not very good. ***JW***

MORE CHIPS PLEASE



I have just inserted a ROM sharer with V1.3 and V2.04 Kickstarts. I also put in an 8372B Agnus. Can I remove the 0.5Mb on-board Chip RAM and replace it with 1Mb? If I get a Supra RX expansion will any of this be configured to Chip memory? All I want is as much Chip RAM as possible – I am experienced in soldering so board modifications are no problem!

Finally, is my Agnus the super-fat one giving 2Mb Chip?

Philip Clagie, Moreton, Merseyside

To use 2Mb Chip RAM in your Amiga you will need more than just a simple board alteration. You will need to add the DKB MegaChip board. This has a socket to take your 8372B Agnus chip (so make sure you order one without the Agnus chip), and provides the extra 1Mb of Chip RAM you require. There is no way to make RAM in external expansions (like the Supra RX) work as Chip RAM on the Amiga, and yes, your 8372B Agnus is the 2Mb Agnus chip from the Amiga 3000. ***JR***

VGC GVP FOR PC



I have an Amiga 500 and 1Mb of memory. I am thinking of buying a GVP 52Mb hard drive, 4Mb RAM and the GVP 286 Emulator. I have recently read in another magazine that it would be best to combine the GVP HD8 with the GVP 286. But, would it be correct to assume that the GVP 286 could be used with the RocTec hard drive to the same standard? As this option is around £70-100 cheaper, please give me your honest opinion: is the GVP 286 worth buying in the terms of extra speed and acceptability of PC disks?

Mr PN Reynard
Otley
West Yorkshire

The GVP PC-286 Emulator is only compatible with the GVP HD8 and the GVP A530 Turbo, as these are the only products to feature the GVP 'mini-slot', which the GVP 286 Emulator plugs into.

In my honest opinion regarding the best accelerator buy for the A500, it is almost a draw between the KCS Power board and the GVP 286. The GVP 286 is definitely the faster of the two, but the KCS now

features Sound-Blaster Emulation, and a high-density drive adapter should soon be available for reading 1.44Mb disks.

These options are sadly not available for the GVP PC card, although it makes up for it by being at least three times faster. It all depends on what you need! ***WR***

OFF TO A GOOD START

I have Kickstart 1.3, and I am thinking about upgrading to version 2.04 or 2.05. I have a few questions to ask about this upgrade:

a) What is the difference between 2.04 and 2.05?

b) I have a revision 5 PCB and have read that a special ROM sharer has to be used – is this true? Also, in the December 1992 issue, there is an article on a DIY sharer. Would I be able to use this method, and what modifications would I need to make to be able to use it?

c) Is Workbench 3 compatible with Kickstart 2.04/2.05, or will I be forced to upgrade yet again?

d) I am thinking about upgrading to a 1Mb Agnus chip, or the 2Mb Chip board. Is the revision 5 PCB suitable for either of these – in other words can it handle more than 0.5Mb of Chip RAM? Also, will these programs work properly with more than 512K of Chip RAM and only 0.5Mb of Fast RAM?

X-CAD 2000 Version 1.1
Pen Pal Version 1.3
Deluxe Paint 4

Will any of these programs run better with 2.04, and will any of them not work?

e) If I bought an accelerator, would the Fatter Agnus or Mega-Chip board become redundant?

f) Would any of the above programs take advantage of the accelerator and 32-bit memory?

Alex Workman
Enfield
Middlesex

a) Nothing! Well, nothing to speak of. 2.05 contains a number of small bug-fixes, and support for the PCMCIA card slot. There is no specific advantage in going for one over the other.

b) Kickstart 2.04 ROM expansion kits from Commodore come with a flying wire for some older revision boards, and complete instructions on how to perform the upgrade. With any third-party expander, it's always best to check with the supplier.

c) No. Workbench 3 is a whole new concept, and requires new Kickstart ROMs. However, Workbench 2.1, which offers most of the features of 3.0, will work with Kickstart 2.04/2.05. It is not available yet, but should be shortly.

d) Workbench Applications such as *DPaint* will benefit extensively from additional Chip RAM. 2.04 adds little in the way of features to any of these products, but is a much more powerful and stable version of the operating system. As far as the Chip RAM expansion goes, how easy it will be rather depends on which version of the Fat Agnus you have. It's probably best to take the whole machine to your dealer.

e) No, it would not. An accelerator simply makes your computer go faster, it will not make any Chip RAM upgrades redundant.

f) Yes. Basically any Workbench-based application software package will benefit from having a faster processor and 32-bit RAM. ***TS***

MAKING A DATE

When I type 'list df1:' in the shell on my A500 I get a correct statement of today's date, then a list of all directories and files on the disk in my external drive. Beside each item there are some numbers and a date. Could you please tell me what decides the date quoted? Sometimes it seems to be the date a disk was formatted, regardless of the subsequent dates on which files were saved.

Sometimes it seems to be the date given to a previous file saved some time earlier. Sometimes it is the date a file was last modified. Is there anything I can do to ensure that the date given is the one on which I saved or last modified the file? The clock in my Amiga always shows the correct time and date when booting up with workbench.

AS Fan, Tyne and Wear

Date-stamping of files actually occurs whenever there is a direct re-writing of the file involved. The date stamped onto that file is the current date and time. If you were just to modify the protection flags of that file then the date-stamp would not be altered. When using the CLI, the date stamp of the parent directory is altered to the current time when something is copied into it. You must also make sure that the system clock is loaded while file handling else date stamping will be very inaccurate. ***WR***

PERSONAL STATIONERY

I own a Yamaha PSS-480 music station and am interested in getting started with music on the Amiga. Is there any way I can connect the PSS-480 to my set-up?

G Owland
Cyprus

It's been a long time since I have actually seen a PSS-480 but it has MIDI connections so it should be easy enough to get it to work with an Amiga sequencer program. You'll need a MIDI interface and a few MIDI leads and, since I believe that the PSS-480 can operate in two different modes (one where the tone generator circuitry acts separately), a little experimentation may also be called for. Some Yamaha synths have the annoying habit of echoing all MIDI data that comes into the MIDI IN terminal, and this can occasionally cause difficulties once you get into multi-track sequencing. Some sequencers, Gajit's *Sequencer One Plus,* for example, provide selective channel filter fixes for this 'echo' problem. ***PAO***

BOOTING WITH CDS

I have an Amiga 500 with Supra 500 hard drive, and an Amiga A570 CD-ROM drive. I am only able to boot from floppy or CD with the CD on, not from the hard disk. Is there any way of reconfiguring so I can boot from the hard disk and access CDs, or will I have to wait for hard disks and RAM expansions for the A570 so that it uses the in-built priority to boot from hard disk if no CD is present? I know it's a bit early for CD-ROM questions, but please help!

Chris Busby
Crawley
W Sussex

There isn't a way of directly booting from the hard disk with the A570 turned on. To be honest, knowing how the Supra hard disk works, it's surprising it works at all with the A570. Your best option is to boot from floppy and transfer control to a RAD: disk to mount your hard drive after reset. With a SCSI hard drive attached via the CDTV SCSI interface to the A570 this problem does not occur, and you can use hard drives, floppy drives and CDs as you would expect. And don't worry about it being too early for CD questions, I was using the Supra-A570 combination over six months ago! ***JR***

EXPANSION DILEMMA

I currently own an A500 and I'm in a bit of a dilemma (who isn't?). I'd like to expand my system to include a hard drive with a view to using a PC emulator in the very near future.

I'm wondering whether it would be a better idea to sell my A500 and buy an Amiga 1500. The price of expansion devices such as hard drives seem to be cheaper for the A1500. Would this be a good move?

I remember a while back a company that sold a case conversion kit that allowed the A500's innards to be stripped out and installed inside a PC-like casing. Is this still available and, if so, would this be a better bet?

Alan Cheung
Bradford

If you're not interested in the Amiga A1200, then I'd personally recommend that you hang on to your machine for a couple more months. Word has it that a new mid-range A2000 replacement is to be released early next year for under £1000. Rumoured to be based around a 68030 with a 68881 maths co-processor in an A4000-like box with a separate keyboard, the new machine also has the new 'AGA' chip set. Several US-based developers claim to have seen the machine, so I think we can safely assume that it is more than just pure speculation. Mark my words – the A2400 will soon be with us. ***JH***

CUB TROUBLE

I own a completely bog-standard A500 Plus. Is it possible to connect this to a Microvitec Cub colour monitor? The only form of input to the monitor is a DIN socket marked 'TTL INPUT'. If it is possible could you please tell me the pin connections and if it isn't possible, can you tell me why? I'd really like to get this sorted out as trying to word process using a TV is terrible!

Glenn Hargreaves
Treloggan
Cornwall

It is possible, but some internal modifications are required to convert the monitor from TTL to Amiga and you'll need more detail than I can supply here. Mark Smiddy ran a tutorial on the subject way back in *Amiga Shopper* Issue 3, or you may want to get in touch with Meedmore Ltd (☎ 051 521 2202) who can do the job for you if you don't fancy doing a little surgery yourself. ***GW***

WHO, WHAT, WHERE?

I have bought *PageSetter II*, which lives up to expectations except for one or two snags I am having.

With *PageSetter 1.2* I could remove all the boxes and move the script around at leisure, which made lining up very easy. I can't seem to

do this with *PageSetter II*. Neither can I get reverse printing – white on black that is.

Except for the Compugraphic fonts, which are excellent, all the other fonts supplied are rubbish, so I treated myself to a set of outline fonts. But as much as I have tried, I cannot get them to load. Can you please advise?

W Gazzard
Bristol
Avon

Sorry, Mr Gazzard, but your letter is a classic case of not enough information and poorly expressed problems. "I cannot get them to load" means nothing. Exactly what have you done? Exactly what happens? Exactly what is the name of the outline fonts package you bought and exactly where did you get it from?

Sadly, neither can I make head or tail of "I could remove all the boxes and move the script around at leisure, which made lining up very easy". Remove what boxes exactly? Lining up what?

But I can help with the white-on-black problem. The solution is simply to drag a block over the text concerned and then give it a white solid fill colour, and then give the box that contains the text a black solid colour. You do this by first selecting the 'Frame' tool in the 'Active Box' requester and then choosing a fill colour for it from the menu. You may need to adjust that particular box's margins to bring the text down and to the right a bit, allowing some black above and to the left of the text. ***JW***

THE HALL OF FAME

Please could you explain how to go about writing a high-score table routine for a game I intend to write in assembly language. Also, how can I get a *DPaint* file onto the screen as graphics data?

Bill Chessell
Hants

There are almost as many ways of doing this as there are score tables. Let's suppose you want to always store and display the top ten scores in ascending order. You'll need routines to write and read the data-file that will hold player names and scores. There are low-level AmigaDOS file functions that can handle this easily enough and you open and use the DOS library just as you would any other Amiga run-time library. You will also need to knock up a routine to display the contents of the high-score file on the screen – this could easily be done using Intuition-based **PrintIText()** calls to display the appropriate data on the screen. If you are going to collect the data and then update the score table you'll need another routine that does the necessary updating whenever the final score is higher than the current lowest stored score. You might, for instance, open an Intuition requester so that you can prompt the user for their name before placing the new score-name pair in the appropriate file position.

Having updated the high-score file you could then use your general table display routine to re-display the updated contents. I'm sorry I can't be more specific about this but there really are a hundred and one ways to do this sort of thing and much depends on exactly on how, graphics-wise, you envisage your high-score table operating.

Programs like *PowerWindows* can take files stored as *DPaint* IFF brushes and convert them into Intuition Image format, and so produce the equivalent 68000 assembler data statements. This allows you to display the data using Intuition's **DrawImage()** library function or to use it as part of other image-related graphics functions. The bitplane data can also be treated as raw screen data and pumped directly into bitplane memory, which is also useful at times. ***PAO***

TOP TEN SUPPLIERS

Following your article on accelerators in the December edition of *Amiga Shopper*, could you please advise me of a supplier of 68010 chips?

Andy Evans
Langton Green
Runbridge Wells

Most major electronic component suppliers have them. RS, or to be more precise, the company's private purchase section, 'ElectroMail', has the chips at £18.70 for the 8Mhz version, a more than good enough Motorola build with a chip name of MC68010P8. RS can be reached on ☎ 0536 204555 or by post at ElectroMail, PO Box 33, Corby, Northhants NN17 9EL.

If you shop around you should be able to get 68010s for as little as £10-12. ***TS***

SPECIAL ASSIGNMENT

There are several things I would like to be able to do with icons – I hope you will be able to explain how to:

a) Add assigns to an icon.

b) Ask for input of a filename in a script or from an icon.

c) Change the pointer but not the main Prefs settings.

I do have some other questions. First, what is the point of using diskcopy or even copy from the CLI?

Also, do you agree that most coverdisks, PD disks and such like, should not have a full Workbench on them all the time? When I buy a disk like this, I always feel that I have been conned or that my intelligence has been insulted.

And finally, how's about some tips and tweaks for *Sid* and *Opus* users? You could ask for user's tips, and list the errors they get – for instance, why do I keep getting "Object in use", which means I can't delete?

Des Handley
Barking
Ilford

Unfortunately, Des, your questions were rather difficult to read, so I'm afraid I will have to improvise a little where necessary.

a) To add assigns to an icon, simply create a script file, using *Ed*, for instance, saying **Assign CGfonts: dh0:ProPage/CGfonts.** Place this file in the directory where you want its icon to be. Next, create a project icon for it, and using 'Information' from the menu, add **C:IconX** to its default Tooltype.

b) This all depends on the particular context you are referring to. I presume you would like to input and store filenames as variables, so they can be processed by another command later on.

In the case of the following example, the script asks you for a the name of a file, which it later displays on the screen:

```
.key file

if "<file>" EQ ""
skip askfile
endif

if exists <file>
type <file>
quit
else
echo "File does not exist!"
quit
endif

Lab Askfile
echo "Please Enter Filename."
echo "file:" noline
execute >nil: ↵
sys:scripts/fileEntry ?
```

This short AmigaDOS script works by setting up a key variable for the filename. The first time the script is executed, a prompt appears for the input of the filename as no arguments are specified. The whole program is executed again, this time with the **?** parameter, which asks for arguments to be passed into the script. After entering the file name, which is the key variable **<file>**, this is acted upon by 'typing' the file. An error detection facility is incorporated which finds out whether the file exists or not.

c) Changing the pointer without changing the main Prefs settings is done by loading 'pointer'. You can change the pointer as you wish and then exit to the main Prefs menu and save. No changes are made to the other settings.

Good uses for Diskcopy function may not be immediately obvious, but you'll find that it is handy from the CLI when you want to enter the FFS (Fast file system) option or just do a Quick format without Trashcan icons.

Workbench is placed on most PD disks so that those without hard disks can easily access the contents without having to load up their own copy of Workbench. It is also often necessary to execute various commands in the startup-sequence that are related to the software contained on the disk. ***WR***

JARGON BUSTING • JARGON BUSTING

Accelerator board – a device which either includes a central processor like the Amiga's, or a more advanced one in the same range, but operating at a higher speed. An accelerator is useful for calculation-intensive applications, such as 3-D rendering.

MIDI – Musical Instrument Digital Interface is a standard devised by electronic instrument manufacturers, allowing a number of synthesisers to be controlled by a single keyboard or sequencer.

ROM – Read Only Memory is used to store essential programs, such as Kickstart and many of the library routines. These do not have to be re-loaded each time the Amiga is switched on because ROM retains its contents without power. No new information can be written to ROM, hence the name Read Only.

Script – a meta-AmigaDOS command built from other AmigaDOS commands. More usually referred to as a batch file on other systems.

Sequencer – a piece of software which stores musical scores and transmits this information in real time via MIDI to synthesisers which will then play it.

SCAN BY YOUR MAN

In your PD section, I have noticed that you are giving an increasing amount of coverage to disk magazines. I would like to make one of these myself which I could hand out to my friends. Would *CanDo* handle the job or is there a PD program available designed specifically for this task?

Also, I am thinking of buying a black and white hand scanner. Which would you recommend? I understand that the Power Computing hand scanner is worth considering.

Mark Reeves, Slade Green, Kent

CanDo will do the job, but you're probably better off with a very impressive PD disk magazine authoring system called *Magnetic Pages*. It's geared entirely towards the task of producing disk magazines, so you'll probably find it much easier to work with. It's on Fish disk 684.

As for the hand scanner, the one that I personally recommend (and I know that our DTP Editor, Jeff Walker, would agree with me on this) is the *Power Scanner* from Power Computing – see page 64 of this issue for a review of the very latest colour version. ***JH***

I'D THINK TWICE

I am now a happy owner of a new Amiga 600HD, but I have a serious problem! My old 500 Plus had a SCSI disk of 105Mb and now they say I can't connect a second hard drive. Commodore say that theoretically it can have two IDE drives but you need to open the machine and have a connection lead outside the case somehow.

Can this be done? If so, how? By the way, how do you connect a second SCSI drive? The reason I ask is because SCSI drives how have removable cartridges which I think is pretty neat – but IDE drives seem lacking in this area.

Freyr Njardvik
Egilstadir
Iceland

Connecting two IDE drives to any computer is a painful and often pointless exercise. SCSI drives are relatively compatible – you can link up to seven different devices to one controller, but with IDE you have all sorts of weird jumper settings to set on each drive, and some drives won't work with drives from a different manufacturer.

The other problem with the Amiga 600HD IDE is that it is a 2.5-inch IDE connector, which is not the same as the standard 3.5-inch IDE connector found on most 3.5-inch IDE drives. So, adding a second external IDE drive to an Amiga 600HD is extremely difficult.

Adding extra drives to a SCSI controller is simple. You just set the SCSI device number on the new device and link the device to the external SCSI port on your computer. There are IDE removable cartridge drives, including an IDE version of the popular Syquest 44Mb and 88Mb cartridge drives, although again these will be difficult to link to an Amiga 600HD. ***JR***

32-BIT BOPPER

I am currently considering the purchase of an Amiga A1200 and I would be grateful if you could clarify some areas of its specification and expansion capabilities.

a) From your article in the December issue, I understand that the A1200 runs approximately four times faster than an A500. What exactly are the practical advantages of this, bearing in mind that the A1200 has a more demanding operating system?

b) Since the A1200 is based on a 32-bit processor and full 32-bit architecture, will it require expensive 32-bit RAM chips? The current PCMCIA RAM expansions for the A600 seem rather expensive so it would be nice if the A1200 could accept internal RAM ones.

c) I understand the A1200 has 2 Mb of RAM as standard. Does this mean it has 1Mb of Fast RAM and 1Mb of Chip RAM?

d) What capacity floppy drive does the A1200 have? Does it use a standard 880K unit or the far superior 1.76Mb units to be found in the A4000?

e) Is the A1200 compatible with hard drives for the A600?

f) If I buy an A600 IDE drive separately, will I receive all the necessary software that I will need to format the drive?

g) Could you please tell me about *Deluxe Paint 5*?

David Lambert
Garrowhill
Glasgow

a) Having a faster computer is like having a faster car – you get where you want to go faster or, in the case of the A1200, you get what you want faster. The A1200's faster processor and 32-bit architecture speeds up virtually every aspect of the Amiga including the Workbench. Once you've used an accelerated Amiga, you'll never want to go back to a 68000-based one.

b) To get the A1200 to run at full speed, you will need 32-bit RAM chips, though it can also use 16-bit RAM in the shape of a PCMCIA RAM card. I don't see how you can claim that a PCMCIA RAM card is expensive – a 4Mb PCM card can be bought for under £200!

c) The A1200 has 2Mb of Chip RAM. However, any more RAM that you add to the machine will be treated as Fast RAM.

d) Unfortunately, the A1200 still uses the same 880K disk drives that you'll find in the A500 and A600. Commodore had planned to fit the machine with a high density disk drive, but this would have bumped the price up quite substantially.

e) The best way to answer this one is to direct you to this month's cover feature on IDE drives, which you can find by turning back to page 14. However, I will make the point that, when they appear, you'll also be able to use A600 hard drives that connect to the machine via the PCMCIA slot.

f) Not usually, although you could try asking the supplier for the necessary software when you buy the drive. Once again, this month's cover feature has a lot of further details on this topic, and you'll also be interested in the news story on AmigaDOS Release 2.1 on page 7.

g) As far as I'm aware, there's no such thing as *Deluxe Paint 5*. What you are probably referring to is *Deluxe Paint 4.2 AGA* which provides direct support for the new AGA chip set. Electronic Arts demonstrated this to us lucky journos at the recent launch of the A1200 and from what I've seen, it's one hell of a program. Boasting a proper Workbench 3.0 user interface and full support for the A1200's new screen modes, it should be available by the time you read this. Keep your eyes peeled for a full review soon... ***JH***

THE WAY TO DTV

For some time I've been involved in home video production – holidays, weddings, anniversaries, and so on – and compiled my own captions and titles using Letraset, stencils, cutouts and the like. Now I want to go the whole semi-pro hog and use a computer to assemble editing, captions, titles and animations. I would like to be able to wipe, dissolve and fade these over live video.

However, trying to obtain information on 'Desktop Video' from local retailers is like trying to get someone to explain how to make a hydrogen bomb! So I'm hoping that you will be able to point me in the right direction in the following areas, bearing in mind that I have a budget of £1000 to £1500 and a Sony V700 camcorder, Panasonic NV-FS88B S-VHS recorder, Sony KV2532 S-VHS TV and audio dubbing mixer for video equipment. My questions are as follows:

a) Which computer should I buy – an Amiga 600, Amiga 600HD, the new A1200 or something else?

b) What sort of genlock (if any) do I need?

c) What else do I need for assemble editing?

d) What software should I buy for painting and graphics?

e) I also have a Sony 14-inch TV. Will this be OK for use with the Amiga or will I need a specific monitor instead?

Being a complete novice I have probably left out some items which you may consider essential, so feel free to correct me.

I am also concerned that if I buy from a mail order company I may be sold 'grey import' equipment which is not genuine and has doubtful warranty cover. But it does appear that buying computers and software is much cheaper by mail – so will I be safe?

Mr G White
Coventry

I'd tend to go for the new A1200 for a number of reasons – the new screen modes for one, the latest operating system for another. You'll probably want to add a hard drive at some stage but until you are proficient with your computer you could possibly wait. Mind you, hard drives are extremely useful, and if you do decide on buying one go for the biggest you can afford – and definitely larger than 40Mb. However, I would recommend adding at least 2Mb of extra memory immediately. If you don't have a hard drive you will find a second floppy drive handy, but not necessarily essential.

A genlock will definitely be indispensable if you wish to overlay titles and graphics onto video. You'll need one with S-VHS capability and at this stage I'd recommend the Electronic Design Y-C genlock (as reviewed in *Amiga Shopper* Issue 9). Another possibility is the new G-Lock from GVP, which was being demonstrated at the Future Entertainment Show at the end of last year and looked pretty good, though I've not had chance to take a close look at one yet. Both these genlocks also have composite inputs, among other features.

There are several editing systems available, including Gold Disk's *Video Director*, EMR's *VideoPilot* and Syntronic's *EditMan*. All work differently and cover a range

of prices. Perhaps the *Video Director* may be a good choice for you, but check first that it will work with your equipment. Jessops sell the *Video Director* and, as luck would have it, have a branch in Coventry, so perhaps that might be a good place to start.

The first choice has to be *Deluxe Paint IV*. For graphics, animations and titles it's hard to beat for all-round performance and should suit most of your needs well. For scrolling captions there is *Big Alternative Scroller* – a new version of which has just been released. These programs will provide a fine start and you may later consider something like *Broadcast Titler 2* (though you should wait until it works with the new AGA chips in the A1200).

Yes, your Sony will probably do fine as long as it has at least a composite video input, and especially if it has a SCART input for RGB or will take S-VHS video. However, a dedicated RGB monitor will provide crisper graphics images, so perhaps you should consider a Philips 8833, Commodore 1084S (or similar) monitor.

That's about it, so you'll be pleased to see that you weren't too far off the mark yourself.

In answer to your last point, if you are really concerned about being fobbed off with a grey import (which is pretty unlikely if you use a reputable company) make sure that the firm you buy from is a member of the *Mail Order Protection Scheme* (MOPS) and, if possible, pay by credit card to gain some insurance and refund cover. You'll find more information on ordering goods in the back of every *Amiga Shopper* (page 136 in this issue). ***GW***

1200 COMPATIBILITY

Please could you print this, because I am a desperate man! I have three questions to ask:

a) Is it possible to connect my 120Mb A530 to an Amiga 1200 in any way? I have read that someone will be bringing out a SCSI II PCMCIA card, so will a lead go from this to the SCSI port on the GVP?

b) If that works, would the A1200 be able to detect the RAM in the A530?

c) Lastly, if none of that works, is there a way of linking the A500 Plus to the A1200 so that the A1200 can store files on the GVP A530? I have asked the following questions because I don't want to sell the A530, and I was about to buy a DCTV for all those colours, but why bother when the Amiga 1200 has them already and is the same price?

Mr GM Read,
Woodlands Vale
Scarborough

a) No. Well, not really. Sort of. You could connect the drive if the A1200 had a SCSI port, which it currently does not. If someone bought out a PCMCIA SCSI card, you could attach the drive, but not the entire A530.

b) You cannot use the 68030 in the A530, and the RAM is useless unless someone comes out with an A1200 memory expansion board that takes the same RAM modules. Your best bet, to be honest, if you really want a A1200 (and it's a wonderful machine) is to sell the A530, and get the A1200. You will suffer some loss of speed, and you will be forced to buy an IDE hard drive which is slower than SCSI. Alternatively, wait for a few months and see what peripherals everyone comes out with for the A1200 – this may make the transition from your A500 Plus to the A1200 slightly more attractive.

c) You could link the two using some PD software called *ParNet*, which involves construction of a strange cable that connects two Amigas together using the parallel port. It is reasonably fast, and can be quite useful. ***TS***

PROWRITE CRASHES

After creating a document with *ProWrite* I select Print from the Project menu. That requester appears, then the program crashes with the following message: "Program failed. Wait for disk activity to finish. Suspend or Reboot."

Rebooting is a real pain as my document is lost, unless I remember to save it.

The same error happens if I select Page Set-up from the menu. Sometimes the program doesn't crash – one out of three times perhaps. Is *ProWrite V3.0.1* not compatible with the Amiga 500 Plus and Workbench 2? And what is the Suspend option for in the Program Failed requester?

Peter H Smith
Chorley
Lancs

That version of *ProWrite* is quite old. In our word processor round-up way back in Issue 6 we were using V3.1.1. *ProWrite* is now much enhanced, and up to version 3.3. I suggest that upgrading to this latest version will get rid of your problem.

The 'Suspend' button suspends the task that has crashed but allows you to continue using the Amiga without having to re-boot. This is useful if you're multitasking with a lot of memory and want to finish off some work you are doing in another program before hitting **[Ctrl]-[Amiga]-[Amiga]**. ***JW***

STARTING WITH C

I've just started to program in C and when using the *NCBoot* disk that you showed us how to create I always run out of disk space. How can I save programs to another disk? How can I add icons to programs so that the programs work when I click on the icon? How can I make a program execute automatically, when my Amiga boots up?

Amiga Shopper Reader
Tyne and Wear

Sounds as though you are creating files on the *NCBoot* disk itself. If you type 'cd ram:', so that you can edit and compile all your programs in RAM, then your "disk full" problem should disappear and you will be able to copy those RAM files anywhere you wish. If, say, you place a disk in drive df1: and type:

```
copy ram: to df1:
```

then you'll copy all of your RAM files over to the disk you've placed in drive df1:.

To make a program runnable from the Workbench you need to link it with a piece of code called a 'startup module'. This takes care of the somewhat tricky message-handling operations that have to be carried out by Workbench programs before they run. C startup code usually does a few other things as well such as opening the DOS library and setting up the standard input and output streams (the so called input/output handles). You'll find *NorthC's* startup module **crt0.o** in the **libs** directory but you should note that, depending on a program's I/O requirements, it may not always able to run from the Workbench. Programs which run from the Workbench do not have valid stdin/stout handles and so a program which, say, uses the **printf()** statement, could crash the operating system if run from the Workbench. Some startup code modules open a CLI/Shell window and set up stdin/stdout handles automatically to protect against this type of program failure.

When the Amiga boots up it automatically executes a set of the commands specified by a file known as the 'startup-sequence'. To make your own program start automatically all you need to do is add the program's name to the list of commands given in your startup-sequence. ***PAO***

MAKING LIGHT WORK

Occasionally when switching on the computer, without a disk in the internal drive, the drive light comes on and the drive starts working. On other occasions the drive does not check when a disk is inserted, and nothing happens. The same happens with all peripherals disconnected. 60% of the time the drive works normally. Is there a fault in the internal drive or is the problem more serious?

H Osborne
Stynechale
Coventry

It sounds like the switch on the disk insert line on your floppy drive is faulty. This will probably require replacement of the drive unit. ***JR***

This month's Code Clinic appears on page 50

EXCELLENT – NOT!

Armed with my student loan and a list of items your magazine had reviewed, I headed for a computer show and saved a lot of money.

I bought a Power Scanner, *Excellence 2* and a Canon BJ-10ex printer. Some five days later my IBM-owning friend was green with envy when I showed him my aerospace assignment on-screen.

But when I attempted to print it... disaster! The page numbers I had inserted into the footer of each page would not appear, and at times the last four sentences were missing, even after checking that the assignment was aligned perfectly on the screen.

As a last resort I had to pencil in the page numbers. Apart from being tacky, this cost me in overall presentation grades in my four assignments.

Aymen Mussad, London

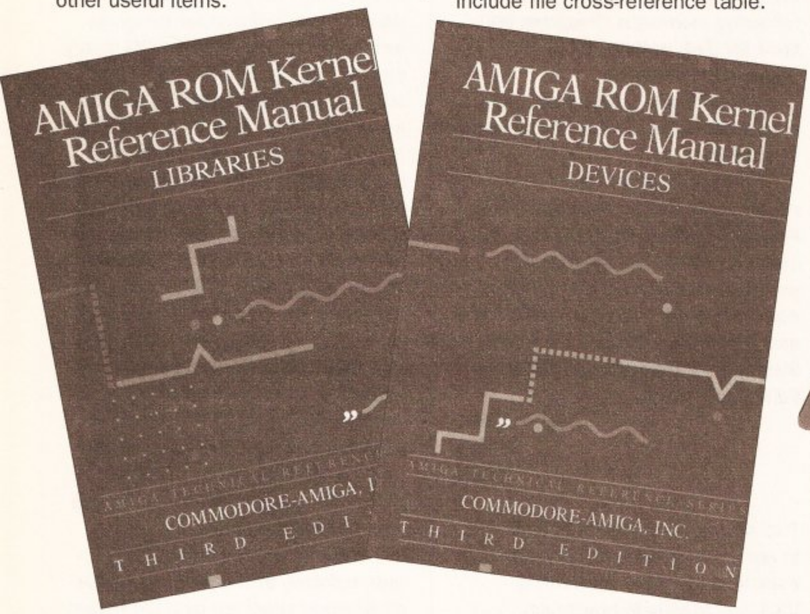
The BJ-10ex, like many cut sheet printers, insists on keeping half-an-inch at the top of each page and half-an-inch at the bottom for itself, so that it can feed the paper in and out of the printer. Things are going missing and getting out of step because after the printer feeds out the paper (which it has automatically recognised as being half-an-inch from the bottom) it has to print the remaining text on that 'screen' page on the next sheet of paper.

Reduce your page size in *Excellence* by an inch (six lines), and keep in mind when setting top and bottom margins that there will already be half-and-inch at the top and bottom to start with. So if you want an inch top margin, set it to half-an-inch in *Excellence*. ***JW***

Read just about any article on programming in *Amiga Shopper* and you'll find a recommendation for Addison Wesley's *ROM Kernel Reference Manuals* (often abbreviated to *RKM*). The reason is simple: they contain all the information you need to know in order to program the Amiga properly. Let's take a look at the latest editions, updated to take account of Workbench 2.

AMIGA ROM KERNEL REFERENCE MANUAL – INCLUDES & AUTODOCS

This volume contains details of all of the Amiga's include files and function autodocs. It also contains a host of other useful items.



The first section provides the library summaries and it must be said at the outset that this material is essential for the serious Amiga user, because it contains details and usage instructions for every routine in every library. Function descriptions are organised alphabetically, library by library, with an alphabetical function index making it easy to find your way around.

Afterwards comes the devices section, containing summaries of the device calls and so on. This is followed by the disk/cia/potgo and miscellaneous resource summaries, after which comes the very hefty C and assembly language 'include' file listings. This volume also includes the source code for a sample library.

Plenty of reference charts are provided, giving details of the libraries and their function offsets, assembler include file structure prefixes, and structure offset reference details. There's also a hardware register map and a C include file cross-reference table.

AMIGA ROM KERNEL REFERENCE MANUAL – LIBRARIES

This begins by providing a massive introduction to Intuition, the library which provides the Amiga's high-level programming interface. It covers the use of screens, windows, gadgets, menus and so on from the programmer's viewpoint. Because Intuition has changed so much with Workbench 2, there is a lot of new material to be found here (including the use of public screens, the object-orientated BOOPSI Intuition extensions, GadTools and the ASL file requester).

As well as these major system additions you'll find details of the other system changes that have occurred. As some of you may already know, a lot of the Intuition structures and flag definitions used in earlier versions of the operating system have now changed, and consequently a wealth of detail concerning the new extensions has been provided.

Overview-style discussions of how Commodore has attempted to make many of the extensions transparent to 1.3-based programmers are given together with a lot of useful guidelines for programmers that need to work with both the old and new Amiga operating systems (which at the moment of course means the majority of us).



It's worth mentioning that, from the point of view of the applications programmer, Intuition is actually one of the simpler components of the Amiga system to get to grips with. There are plenty of examples supplied in this volume (mainly in C) and the material is, in general, relatively straightforward to understand – this makes the early chapters of the Libraries volume some of the most accessible to the serious Amiga newcomer.

Hidden beneath the Amiga's Intuition interface lies some very complex software components. One such component which both merits, and gets, special attention is the multi-tasking 'Exec' system. Topics covered include the use of Exec functions, lists, library organisation, message passing, interrupts, and Exec's I/O techniques. Most of the Exec material is of course based on that found in earlier editions, but there is now a very good introductory section which includes discussions of the amiga.lib stub routine mechanism, expanded explanations of library layouts and LVO values and so on. All of the main Exec topics are carefully dealt with but because many of the issues involve difficult concepts this stuff is still, as it has always been, hard work when first encountered (even for experienced programmers).

Libraries is also the volume in which you can get authoritative details of the Amiga's superb graphics facilities. As well as general introductions you'll find accounts of such things as the Amiga's display modes, image formation, viewport creation, and so on, and very detailed accounts of sprite handling, Bobs, and the use of the system's animation facilities.

Although the Intuition, Exec and graphics material constitute a large proportion of this volume the other libraries are not forgotten. As well as providing details of all the libraries carried over from 1.3 (layers, translator, maths libraries and so on) there are new chapters on the Commodities Exchange library (used to create standardised custom input handlers), the IFFParse library and the Utility library which houses a variety of functions (such as Tag List operations and callback hooks) that don't quite fit in anywhere else.

This manual certainly provides an immense amount of up-to-date, useful material but it is also obvious that the documentation itself is maturing nicely: improved layouts, better examples, more notes about what programmers should and should not do, snippets of 'inside information', and in general far more help. There even seems, in some places at least, to be an attempt to 'soften' the style slightly – this might just be the effect of the passage of time on the core documentation or it might be a deliberate attempt to make some of the material more accessible to newcomers. Either way it is a very welcome change! It was nice also to read the odd notes about some 1.3 bugs which have come to light (and how they've been fixed) and I particularly liked the Release 2 compatibility notes that have been provided – these include details of some of the tricks used by 1.3 programmers that are now causing some programs to break under version 2.

AMIGA ROM KERNEL REFERENCE MANUAL – DEVICES

This is another area of the documentation where the material has both grown and matured relative

JARGON BUSTING • JARGON BUSTING

Function – This is a C orientated term used to describe a subroutine-like piece of code.

Include file – Files of predefined constants, data block definitions, macros, and so on, that may be 'included' at the front of a source code file using a special directive. When the program is compiled these additional files are read in and used just as if they had been written as part of the source code itself.

I/O – An abbreviation for 'input/output' and can involve absolutely anything which is concerned with getting data into, and out of, a computer.

LVO – This expression stands for Library Vector Offset. Basically these are index values which allow you to specify a particular function within an Amiga library.

RKM – An abbreviation for 'ROM Kernel Manual'

Structures – These are C language complex variables which are frequently used by the Amiga programmer to define of blocks of data (the Amiga system include files contain many pre-defined structures).

of the matter

Paul Overaa takes a look at the official documentation for the Amiga system. Read on...

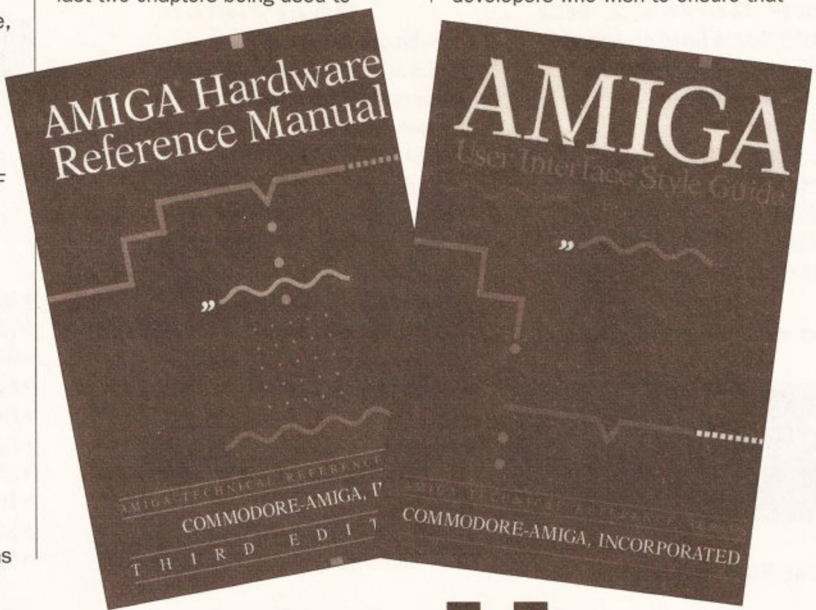
to earlier publications. The manual starts with a good general introduction to the Amiga's devices and their communications methods and this is followed by separate chapters which document the use of those all-important Amiga devices, namely the audio, clipboard, console, gameport, input, keyboard, narrator, parallel, printer, SCSI, serial, timer and trackdisk devices. There is a chapter on the low-level hardware control functions and on the Interchange File Format (IFF). The IFF sections are now quite comprehensive and include useful introductory notes on the EA IFF 85 document, and details of Form specifications. The graphics, music/sound-sampling, and all the other IFF areas are well covered as are many third-party registered Form definitions and there are good selections of code examples and good levels of tutorial-style help.

The good thing about the Amiga's device concept is that it aims to make the whole job of I/O as 'device independent' as is possible. Now, given the widely differing characteristics of most typical physical devices (printers,disk drives and so on) these ideas can only be taken so far but there's no doubt that, despite the fact that each device will have its own special characteristics, a lot of common ground exists with all of the Amiga's devices. This means that this is another of those Amiga areas where, with a little dedication, it is relatively easy to make rapid progress.

AMIGA HARDWARE REFERENCE MANUAL

After a brief introduction this volume dives straight in with a look at the Amiga's co-processor unit, its instruction set, and its use. This sets the scene for a discussion of the playfield hardware and its relationship to the Amiga's display facilities. The Amiga's sprite hardware, audio hardware, and the now famous 'blitter' chip all get a similar detailed treatment with the last two chapters being used to describe the remaining aspects of the Amiga's system control and interface hardware.

If you like to get your hands dirty, if in other words you have to understand and program the Amiga at a low level, or if you want to know how to achieve things like smooth scrolling, then the *Hardware Manual* is the place to look.



AMIGA USER STYLE INTERFACE GUIDE

This volume is more about user interface issues than coding. The volume provides basic advice on Intuition style and consistency together with notes on Workbench, Shell, ARexx, the clipboard IFF data sharing scheme and related issues. It's a subject area which is probably of most interest to commercial developers who wish to ensure that their products follow established guidelines, although there's no doubt that all Amiga programmers would benefit by knowing something about these style-related issues.

FINAL CHAPTER

It is obvious that a tremendous amount of effort has gone into this new documentation, and equally clear that any programmers working with Workbench 2 are going to find these new volumes absolutely essential.

The new manuals still contain a lot of information relative to the 1.3 operating system release but I suspect that many serious users, irrespective of whether they buy the new manuals or not, are still going to hang on to their old 1.3 editions as well simply because the relevant 1.3-orientated information is going to be easier to find in the old manuals. Having said that I ought to point out that the *Includes & Autodocs* function descriptions clearly specify which functions are relevant to which versions of particular libraries Similarly, it is apparent that a special effort has been made with the other volumes to minimise any potential confusion in these two operating system areas.

The technical documentation available for the Amiga nowadays is massive, but while many good tutorial introductions to various areas of the Amiga programming are readily available, the Addison Wesley manuals are particularly important.

Firstly, they constitute the *official* documentation. Secondly, they provide the most complete descriptions of the Amiga software system generally available. This is not to say that other good Amiga programming books do not exist, because they do, but there's no doubt that at the end of the day it is the Addison Wesley manuals that provide the most authoritative and complete accounts of this complex system. If you're serious about programming, you need them. AS

YOU CAN'T RUN AWAY FROM C

The majority of serious Amiga programming books, including the Addison Wesley *RKM* manuals, have been written with the C programmer in mind and even where topics have involved 68000 assembler you'll usually find some dependence on C-style explanations. The bottom line is that without some exposure to the C language, 95% of the wisdom of books such as the RKM manuals will pass you by.

The solution? No matter what language you really want to program your Amiga with... you *must* also learn some C just to come to terms with the technical documentation!

CHECKOUT
AMIGA REFERENCE MANUALS

Ease of Use ●●●○○
Topics are well covered and well indexed but obviously a lot of material requires the programmer to have a good computing background. Newcomers to the Amiga will find these manuals rather daunting in places.

Features ●●●●○
They're authoritative, and very comprehensive. No other Amiga books contain anything like the amount of system information that these official manuals contain.

Price Value ●●●●○
Despite the fact that these volumes are expensive they really do contain an immense amount of useful material.

Overall rating ●●●●○

Serious Amiga programmers simply cannot do without them.

SHOPPING LIST

Amiga ROM Kernel Reference Manual – Libraries £34.95
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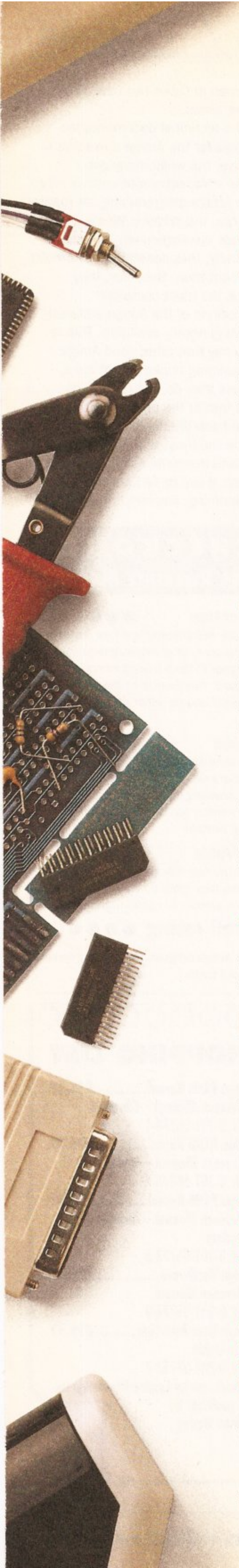
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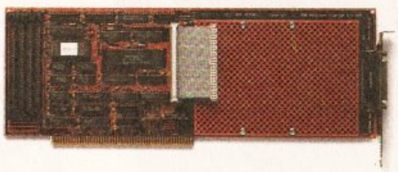
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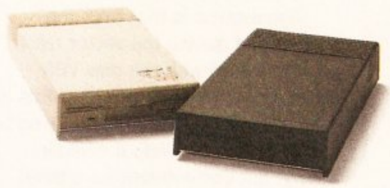
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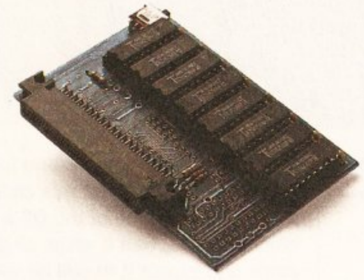
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Program Name: timer.s
Language: 68000 Assembly Language
Problem: Measuring time accurately
Author: M Saunders, Doncaster

CODE CLINIC

In this month's code clinic, I'm going to fix a few problems in a short routine which measures time, and in doing so, totally re-write it from scratch. The program uses the vertical blank timer to count in 50ths of a second, waiting until a specific amount has been counted. It takes the form of a routine called 'waittime' and takes one parameter, in the 68000's register D0, which is the number of 50ths of a second to wait. The way it does this is a little dodgy, which brings us to the the bug in the program: it does not work reliably. The author has even had disk corruptions as a result of using it and is confused as to why.

The root of the problem is in the first few lines of the routine:

```
waittime:
    movem.ld0-d7/a0-a6,-(sp)
    lea     level3,a0
    move.l a0,$6c
    move.w #8020,$dff09a
    ...
```

Quite why this works at all is beyond me. The Amiga operating system (OS) is extremely complicated, and relies on the interrupt system to operate correctly. What this code does is remove one of the OS's vital blood vessels, wait a while, plug it in again and expect it to still be alive. This will not work. You must ask the OS for access to the VerticalBlanking interrupt, by calling a special **exec.library** routine called **AddIntServer** – this will add a routine of your specification to the interrupt chain. You can have the top priority if you wish, and then your routine will be called every 50th of a second. This way, the rest of the OS also continues to operate.

A far preferable solution is to use the **timer.device** in the Amiga to wait for times, as in this month's listing. This co-operates with the OS in every way, and will measure times far more accurately than the interrupt system. The timer device is multi-tasking, and can be asked to "get on with the timing while I do something else, and let me know when my time's up".

GENERAL OBSERVATIONS

1. You have accessed the interrupt system with:

```
    move.l a0,$6c
```

This is very naughty, for two reasons. The first is that you should never access any of the 68000's vectors, ever. The only memory location you're legally allowed to touch in the Amiga other than the custom chips (and only then if you've asked the OS) is $0004, the **ExecBase**, and you're only allowed to read from it. Accessing the vector tables will cause unreliable system operation, and possibly crashes and data loss.

The second is that from the 68010 and above, the vector table can be moved with the new VBR register. A lovely side-effect of this is that the entire table can be moved to 32-bit Fast RAM. Well, it could in theory, but Commodore have been unable to do this because too much software crashed because it accessed fixed locations as in the above example. If you must use interrupts, **AddIntServer/Handler** and **RemIntServer/Handler** will allow access to them.

2. You push lots more registers to the stack than you actually use:

```
    movem.l d0-d7/a0-a6,-(sp)
```

Your entire routine uses a0, a1, d0 and d1 to operate. Pushing data to the stack is a slow process – for fast efficient code, it's best to only push registers you are going to use.

3. In terms of general technique, there are a couple of things you could have done to make your code quicker and more compact. Although I would recommend you look closely at the replacement example below, you might like to bear in mind that if your **leas** are closer than 32K, you can use PC relative addressing to make the instruction shorter:

```
    lea     level3,a0
```

could be replaced with:

```
    lea     level3(pc),a0
```

Both do the same thing, but the latter takes up less bytes. If you are moving immediate data values less than 128 into data registers, you can use **moveq** (move quick). This is much faster, and effects all 32 bits of a data register. This instruction:

```
    moveq    #$00,d0
```

is faster than:

```
    clr.l    d0
```

– the official method according to the 68000 instruction timings!

Although you did not fall into the most dangerous trap with timing, this sort of code is common:

```
Small_Delay:
    move.w #ffff,d0
wait_a_bit:
    dbra     d0,wait_a_bit
    rts
```

This routine will simply wait for a while. Unfortunately, on faster processors, this routine does not wait quite so long. In fact, it returns pretty much instantaneously on anything faster than a 68020 because of the caches. So, you should never use software delays like the above three-line example. Eventually, you'll probably get a better Amiga, and you'd be pretty upset if none of the programs you so painstakingly wrote on your earlier machine worked! *TS* AS

TIMER LISTING: THE SOURCE CODE

```
;  Code Clinic, timer.device example.
;  By Toby Simpson.
;
;  This code is not perfect, it's been optimised so that it is not too long.
;;  It waits for one second and quits.
;
                incdir    "include:"
                include   "exec/exec.i"
                include   "exec/funcdef.i"  ; ! You may not need this line !
                include   "exec/exec_lib.i"
                include   "devices/timer.i"
                include   "exec/io.i"
                include   "exec/ports.i"

_EXECBASE:      equ       $04

SYS:            macro
                move.l    _EXECBASE,a6
                jsr       _LVO\1(a6)        ; Call exec.library
                endm

                section   timer_demo,code

START:          suba.l    a1,a1             ; Quick way of clearing Addr reg.
                SYS       FindTask          ; Get our task ID.
                lea       Timer_Port,a0
                move.l    d0,MP_SIGTASK(a0) ; Set task to signal.
;
                lea       Timer_Name,a0
                moveq     #UNIT_VBLANK,d0
                lea       Timer_IO,a1
                moveq     #$00,d1
                SYS       OpenDevice        ; Try to open timer device.
                tst.l     d0
                beq.s     Timer_Opened      ; Opened OK.
                moveq     #$00,d0
                rts                         ; Return.
;
; - Set up our reply port ....
Timer_Opened:   lea       Timer_IO,a1
                lea       Timer_Port,a0
                move.l    a0,MN_REPLYPORT(a1)       ; This is our reply port.
;
; - Now post our request and wait ....
                lea       Timer_IO,a1
                move.w    #TR_ADDREQUEST,IO_COMMAND(a1)
                move.l    #$01,IOTV_TIME+TV_SECS(a1) ; Set up seconds
                move.l    #$00,IOTV_TIME+TV_MICRO(a1); And microseconds
                SYS       DoIO
;
; - Now quit ....
Timer_Quit:     lea       Timer_IO,a1
                SYS       CloseDevice       ; Close timer device.
                moveq     #$00,d0
                move.w    #$fff,$dff180
                rts
;
; - Our data ....
                section   timer_data,data
;
Timer_Name:     dc.b      "timer.device",0
                cnop      0,4
Timer_IO:       ds.b      IOTV_SIZE
Timer_Port:     dc.b      MP_SIZE
;
                end
```

The crowd who put together your favourite Amiga mag are a good bunch of sorts, clued-up to the eyeballs on all of the latest releases, and whizzos with all the most recent technokit. Truth is, I'm old enough to be the father of most of them, and of course, when we get together, you can imagine how I'm sometimes the brunt of 'old man' jokes. Well, that may be the case, but sometimes it takes an old timer to put the youngsters right, which nicely brings us to the reason for all this ranting and raving. You see, I often wonder if we overlook what we already have, in the headlong rush for what is just around the corner. So, for the vast majority of Amiga users, who don't have hundreds of pounds to spend on the very latest programs, I'm going to show how taking a pragmatic attitude to older programs can be a highly rewarding experience.



moving

HORSES FOR COURSES

Creating animations is one of the most exciting things you can do with an Amiga, and there are numerous packages specifically designed for this purpose. The range of options is enormous, from simple 'entry-level' systems to the very sophisticated. The right choice for your particular needs is not always obvious, as it is always difficult to make sure that you have seen the full potential of all the candidates. So, in my column this month, I'm going to look at two likely contenders, each of which offer different facilities, but, in their own right, are giants. It is usually the case that the *DPaint* programs (version III onwards) are assumed to be the ultimate in animation packages, but this is not always true. The programs I have chosen here have been used time and time again in my school, and can now be picked up at bargain basement prices if you shop around.

HUNGRY FOR MEMORY

It is important to remember that graphical applications of any nature, on any computer, make considerable demands on available memory. Even though there are specific circuits within your Amiga to enable it to perform complex graphical calculations, carrying out lengthy animations demands intensive memory reserves, and on a basic 512K machine will necessitate some degree of compromise or trade-off. The price of memory expansions has fallen dramatically in recent months, so if you wish to use your Amiga for this kind of thing, then increasing the size of its memory must be your number one priority.

GETTING FRAMED

For those of you just beginning to get to grips with using your Amiga (particularly if it arrived via Santa!), I'll now briefly explain the simple principle behind all animation packages.

Creating an animation on a computer is very similar to creating one on film. Frames are constructed one at a time, and the speed at which the the finished sequence of frames is presented gives the impression that the object or image is moving. So each of the animation packages offers frame creating and editing facilities, and some offer even more, allowing your Disney ambitions to go even further.

FANTAVISION, THE FORGOTTEN FAVOURITE

Some of you Amiga veterans out there will remember this program from the past – maybe you gave up using it as more cartoon-dedicated packages came along, and as the new arrival *DPaint IV* showed its wares. Well, perhaps it's time to dust off the old disk, and ask yourself if you really exploited the full potential of this excellent package. I use *Fantavision* constantly at work, and still discover new facilities and uses for it almost every week. What I like about this software is the fact that, unlike some of the subject-specific packages, it does not restrict the type of animations that you can create – *Fantavision* is totally open-ended, and jam-packed with useful facilities. The price is ridiculously low, and the quality of effects quite stunning. So, if you are just entering the world of Amiga graphics, and are looking for the right program for your needs, you should give this one a test drive.

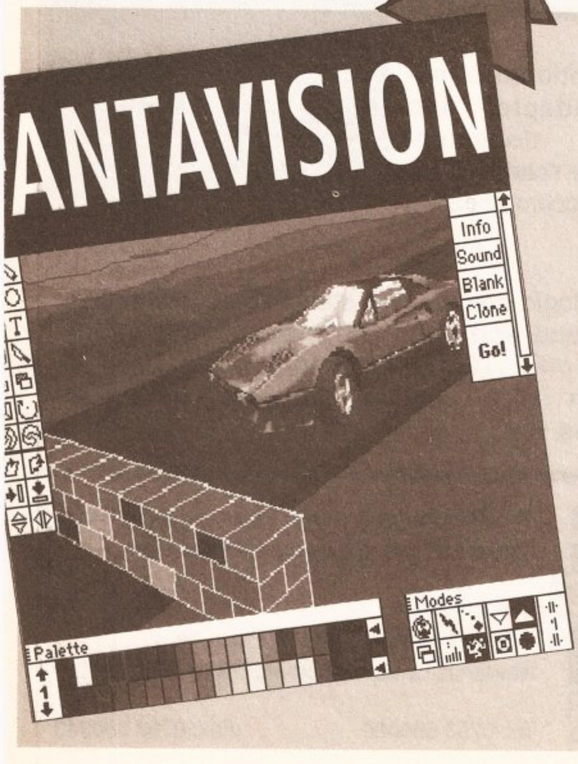
GOING DOTTY

The simplest way to think of *Fantavision* in use is to conjure up an image of those 'join the dots' drawings which are a stock favourite of childrens' drawing books. Using vectors, the program allows the user to create complex shapes, and then move them around the screen. Each time you 'clone' an object, you can then alter it, and *Fantavision* will calculate the in-between frames necessary to create an animation. This particular trick is known as 'tweening', and it works very well.

Any kind of IFF file, including HAM, can be loaded as a background, and subsequent animations developed on top of it.

SOUNDS UNLIMITED

The most endearing (and often amusing) facility this package offers is the ability to add sounds to your animations – or 'movies', as *Fantavision* calls them – and synchronise them with specific frames in the action. Any 8SVX IFF sound sample can be used, so if you own your own sound sampler, you can generate your own sound effects and add them to any movie you make. This particular feature of the package makes it quite unique, in



Fantavision's bottom right-hand menu has loads of features which you'll find handy. The globe icon allows you to make global changes to any object, so for any change you make on a given frame (editing the shape, or changing the colour, for instance), simply click on this icon, and the changes are carried out throughout the movie. The two overlapping squares are used to create 'overlays'. Should you wish to add additional frames to a movie, you can use this icon to keep certain images visible, in order to facilitate continuity of editing. The mountain icon allows objects to be fused with the background.

The lightning mode, symbolised by a stylised flash, creates flashing effects, and the trace mode, shown as a decreasing series of solid circles, creates a colourful stroboscopic effect. As mentioned in the caption below, the bitmap icon is repeated again here, and this is to enable you to load and save bitmaps. The

Shown on the left is the main *Fantavision* work-screen. Along the left-hand side is a collection of icons for generating specific effects. These are associated with drawing, entering text, rotating, zooming, deleting, squashing, flipping and turning the 'objects', which are the building blocks of *Fantavision's* moviemaking abilities. The icon in the form of a square containing a circle containing a cross has a particularly important function – it allows the user to convert a background into a bitmap image. This function relates to another icon in the lower right-hand corner, which is described in the main text (above).

The lower left-hand menu is associated with generating colours and patterns within your animation. The up and down arrow on the left-hand edge allows the user to flip through patterns which can be used for solids or lines. The arrows to the right of the menu determine whether you wish to draw an outline, filled item, or background. The colours may be changed on-screen by using one of the options in the pull down menus, which presents a visual colour selector, and RGB slider bars to make your own choice. A further sub-menu lets you adjust the overall brightness – care must be taken here, otherwise you can end up blanking out your whole screen!

that adding sound to any other animation package is no easy task. Sadly I cannot demonstrate this in the magazine, but the Ferrari in the illustration on the bottom left moves across the screen sounding just like a galloping horse, and hits the wall at the end with a sound resembling a squashed tomato.

The graphic editing facilities also offer a vast array of possibilities. In our example, as the wall is hit, the bricks fly off at assorted angles, and the front of the Ferrari becomes somewhat distorted. Individual picture elements can be picked up as vectors, and scaled, rotated, coloured, leaned over at an angle, or sent to the front or back.

Along with the software comes a 'Movie Player' which eliminates the need to keep loading the package each time you wish to view your work. All in all, if you are on a tight budget, and want a really useful animation package, then *Fantavision* is one to seriously consider. AS

CHECKOUT FANTAVISION

Speed ●●●●●
Really quick, with variable frame rate.

Functions ●●●●○
Versatile in lots of areas. Nice effects.

Ease of use ●●●●●
A doddle to operate.

Overall rating ●●●●●
Brilliant value for money.

SHOPPING LIST

Fantavision £40.85
By Domark ☎ 081 780 2222
Moviesetter £39.95
Available from Diamond
☎ 071 580 4399

MOVIESETTER AND WYSIWYG

Some years ago, Gold Disk introduced *Moviesetter*, a program for creating cartoons. To this end, the package offers very powerful facilities for editing the 'productions', as Gold Disk calls the outcomes. A freely-distributable *MoviePlayer* is included, which enables you to transfer your productions onto video tape.

Moviesetter works by using two principal requesters. One controls the motion in a similar way to a tape recorder, while the other controls the track editing. To support these, there are pull-down menus which give the usual access to loading/saving, and other features.

Similarly, *Moviesetter* uses two working environments: the 'Set Creator/Editor', and the 'Scene Creator/Editor'. All *Moviesetter* productions begin with IFF pictures. These can take two forms in the program: 'backgrounds', and 'faces'. Backgrounds are just that, and can be scrolled vertically or horizontally, independent of other elements in the scene. A face, on the other hand, is a single image of an animated object. A 'set' is a collection of related faces in a logical order – say, the sequence of frames required to make a figure walk. *Moviesetter* is WYSIWYG: What You See Is What You Get. So, the images you produce on the screen are exactly the outcomes you see when the image is animated.

Operating *Moviesetter* is simply a case of developing the faces, and then pasting them onto the background in the right sequence and at the appropriate location. The final results are quite stunning, and as good a cartoon representation as I have seen anywhere.

The biggest limitation you may run into with *Moviesetter* is the amount of available memory. If you only have 512K, then screen colours are restricted, so a memory upgrade is necessary in order to really make the package work.

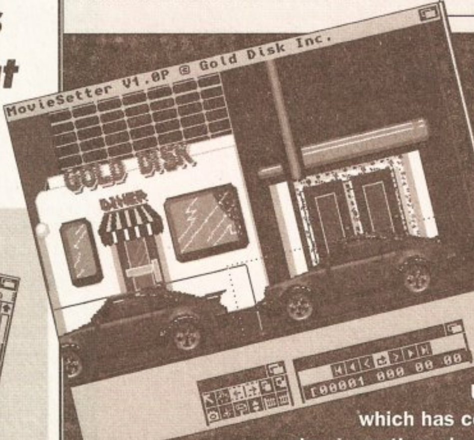
CHECKOUT MOVIESETTER

Speed ●●●●○
WYSIWYG makes producing animations extremely quick and easy.

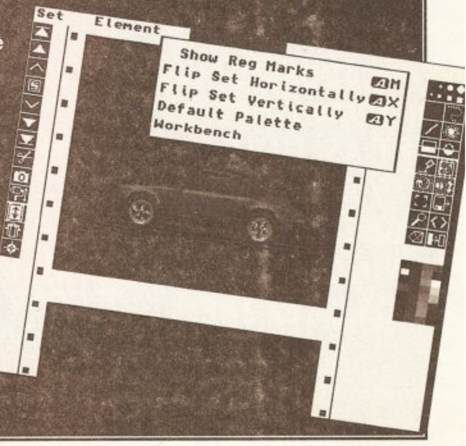
Functions ●●●○○
Limited, as this is dedicated software.

Ease of use ●●●○○
More complex to use than *Fantavision*, but once mastered, not too difficult.

Overall rating ●●●●○
Loses a mark for lack of versatility.



Here we see *Moviesetter's* main scene editor, complete with a picture of a Porsche imported into the heart of the package. Using the track editor (which has a comprehensive range of facilities for cutting, pasting, and manipulating images), I can now set about tracing a sequence of 'faces', to show the path of the car across the screen. Using the player control window, which has controls similar to an audio tape recorder, I can then view the outcome, forwards, backwards, fast or slow motion, or solely at the intended speed. It just goes to show: *Moviesetter* really is a smashing package.

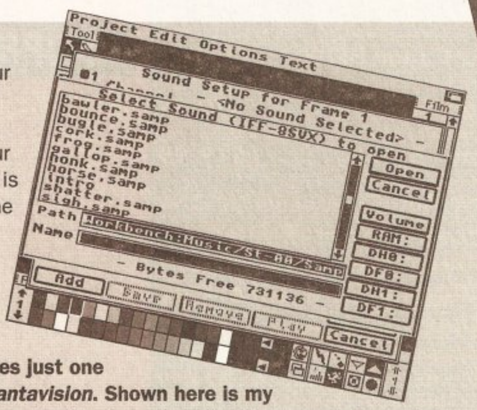


The Set editor in use. This Porsche was actually captured from *Fantavision*, and brought over to *Moviesetter*. There are several examples of clip-art on the second disk in the *Moviesetter* package, and these are classic cartoon-style images. The version of the Porsche shown here has received detailed editing (using the various drawing tools on the right-hand side), and is now ready to be transferred into the main program.

experience

Animation programs open up a world of possibilities – and they needn't cost the earth. Wilf Rees presents some golden oldies that still offer a piece of the action

original, or your current colour map can be selected, and a mask can be selected if you need to draw one around your image. A series of four tools is also provided for changing the dimensions of objects, allowing solid, dimension, line and dot size to be adjusted as required.



This screen picture illustrates just one highly effective aspect of *Fantavision*. Shown here is my sound sample directory. Any selection from this directory can be imported and modified to suit the particular need of the movie. Facilities are available to alter volume, balance, echo, pitch, duration and sustain.

Just behind this requester is the main film window (also visible in the top-right of our first Fantavision picture). Here, each box offers access to further features. 'Info' provides details on number of objects, total frame number, overall speed, and so on. Clicking 'Sound' brings up the window illustrated, and controls all of the audio parameters. 'Blank' allows the insertion of a blank frame at any point, while 'Clone' makes an exact copy of the current frame. And once you have completed all your painstaking frame-making, and wish to examine the outcome, the final act is to click on 'Go!', and your movie will play itself back to you.

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Owning your own computer can be a source of enormous pleasure, and the knowledge and understanding it brings is without doubt beneficial. That is, until something goes wrong. Repairs to computers can cost a small fortune, while the nature of the fault may often be minor. In this series of articles, I have teamed up with Dave Cooper, an electronics engineer who has spent over six years in the business of home computer repairs. Together we'll show that all you need to repair many Amiga faults are confidence, close attention to detail, and a bit of patience and care.

The repairs I am going to describe go well beyond simple everyday checks, so before we go any further, there is one thing that I want to establish firmly in your mind. Always remember that we are dealing with electricity, which is a killer, and with components that can be temperamental. Correct precautions and procedures are absolutely essential if we are to ensure safe and effective maintenance. Some aspects of equipment repair are beyond the capabilities of even the most ambitious or talented amateur, and in those cases you should always leave well alone. But don't worry – these particular cases will be clearly pointed out as we proceed through the series.

GETTING THE RIGHT KIT

No matter how skilled you are, there are still some basic tools and equipment you will need in order to carry out any repair job correctly. These items are as follows:

1. A set of good screwdrivers, with both Philips and plain heads, in a wide range of sizes.

2. Pliers, snout nosed and standard, in at least two sizes.

3. A simple test meter or continuity tester. You don't have to spend a lot of money on one of these – later, we'll be showing you how to make one cheaply yourself.

4. Isopropyl alcohol and cotton buds.

5. An electrical soldering iron, solder, and a de-soldering tool.

6. Spare fuses and wire strippers.

This article will mainly address repairs to the Amiga 500. However, many of the tests and repairs will be applicable to other Amigas in the range, and indeed to other makes of computers. Throughout the articles, I will refer to components by their correct names. Occasionally I may mention the more common names, as for example with the custom chips, which are called things like 'Denise' and 'Agnus', but the master diagram of the A500 motherboard (on page 60) should be your reference for identifying each specific component. So, it's probably a good idea to keep this page handy at all times, ready for whenever you need to tackle a problem.

The range of repairs will vary from the blindingly obvious, through the slightly more technical, to the sophisticated modification of major components. Remember, this information is based on the many years' experience of an expert repairer – you might well be surprised at some of the faults Dave has seen, so don't be sarcastic if you think some of the suggestions sound patronising. Remember that there is a logical progression through the fault-finding stages, and this process is essential if correct diagnostic assumptions are to be made.

> **"40% of repairs to the Amiga 500 involve power supply problems"**

THE POWER SUPPLY

Amiga 500 power supplies come in two forms: the heavyweight transformer-based type (which we'll refer to as 'type one'), and the lightweight thyristor-based version ('type two'). In accordance with the operating requirements of the Amiga, both types of supply provide output voltages of 12V and 5V. However, they are fundamentally different in design. Identifying which one you have is quite simple: pick it up and feel the weight. Type one is about the same weight as a household brick, while type two is much lighter, about the same as a large orange.

There is one simple check that can be carried out on both types of power supplies, and this involves examining the plug to ensure that the fuse is intact, and that the screws are tightened down firmly in the terminals. Occasionally, one of the wires in the cable clamp inside the plug can become broken – stripping back the cable can cure this problem. If you own the lightweight power supply, and it is not functioning, then this is as far as domestic repairs should go. The reason for this is that the lightweight version is of the non-isolated variety, with a rectified charge in excess of 300 volts stored in the capacitor. Were you to attempt a repair, there would always be a risk of a hefty shock from the capacitor, even after switching off. So, this piece of equipment is best left alone – the only recourse is to take it to your dealer. The heavyweight variety, on the other hand, does offer a lot more scope for investigation.

I'M GOING IN

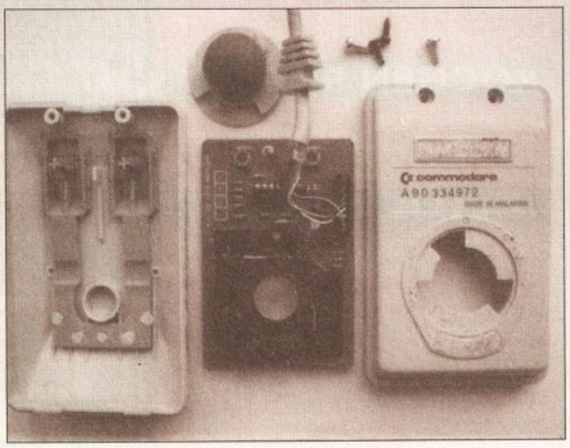
Rule number one is: always remove the plug from the mains before dismantling anything – you know it makes sense. If you look on the bottom of the power supply, it may have one of two possible securing systems. The first simply requires the removal of the four securing cross-head screws which hold the two halves of the casing together. The power supply should now come apart quite easily. On the other variety, there are four white plastic plugs which cover the securing screws. These need to be pulled out first – you can do this by sticking a sharp instrument, such as a darning needle, down the edge, then pulling up and sideways. The plug should then come away with no trouble at all. I suggest that you then chuck the plugs away, as they are nothing but a nuisance, and serve no purpose other than as a mild deterrent.

Inside the power supply there are several components which can be serviced. The first thing to check is that you have continuity along the length of the cable. Remove the cover from the plug, and test each of the three cores of the mains cable up to the circuit board solder points. A common fault here is the cable breaking just inside the power supply at the cable clamp. Next, examine the points at which each core of the cable joins the circuit board. Ensure that the soldered joints are secure, and cleanly attached. If not, strip back a length of the core, clean the circuit board hole, and re-solder the cable into the board. Examine all of the soldered joints on the circuit board to ensure firm connections. If you find that you are getting intermittent power to your Amiga, then this is often the reason why.

CON,FUSE,D?

The next item to inspect is the 400mA (milliAmp) fuse. You will find this located in a small silver fuse-

COMMUNICATION DIFFICULTIES



The innards of the mouse revealed. Be careful when you separate the two halves of the mouse. First, remove the ball retaining plate and the operating ball. The two self-tapping screws on the base are next, and then carefully pull the top section forward to separate the two lugs located in the slots on the base plate. Two black self-tapping screws hold the large black moulding onto the mouse circuit-board, and when removed, they will simplify access to the rollers.

You can easily remove the accumulated dirt from the rollers, as well as from the mouse ball. Check the cable contacts at the circuit-board connector, as well as the single blue cable which is soldered directly to the board. Finally, you can replace faulty micro-switches with a little careful soldering.

The two commonest (and most often recommended) means of communicating with your Amiga are using the keyboard, and using the mouse. Repairs to the keyboard are rather limited. Sticking or inoperative keys are usually a symptom of outside contamination, and the commonest culprit is coffee.

As a general rule, you should bear in mind that drinks and computers simply do not mix. The residue from evaporated coffee is a lovely sticky brown sludge which couldn't be better designed as a keyboard contaminant. If you do spill a hot drink over your keyboard, the first action must be to switch off the power. Each of the keys need to be wiped off, and the surfaces underneath cleaned to remove as much liquid as possible.

I have had conflicting advice on the appropriate course of action to take in this instance, but Dave Cooper suggests removing the keyboard from the A500, and simply flooding the entire mechanism with

holder on the circuit board. Test it with a meter or continuity tester to see if it is still intact. It may be that it is still clean, but broken, in which case you should replace it with a fuse of the same rating. Then re-assemble the power supply, and see if it works any better than before.

If the fuse is blackened, or maybe even has the glass broken, then you need to look at the two large diodes on the circuit board. These are in fact rectifiers, and are cylindrical in shape, with a stripe running around them, near to one end of the component. The diodes are a common source of faults in the power supply, and can be tested in the following way: a diode only allows current to flow in one direction. So, remembering that the end of the component with the stripe is called the 'cathode', connect a meter or continuity tester across the two ends. Anode to cathode should produce zero resistance and register a current, while cathode to anode should give infinite resistance, and register no current.

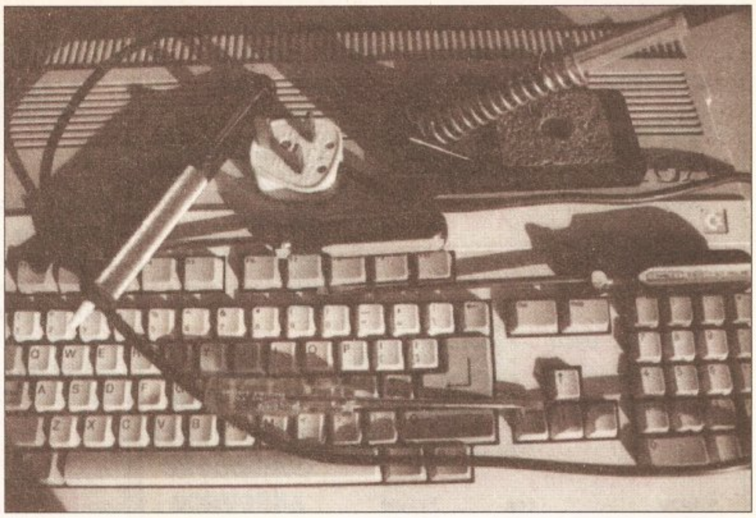
TRANSFORMER TRAUMA

Both diodes should work in this manner. If you find that current can pass both ways through either of the components, then remove them and solder replacements of the same value onto the board. If you do replace the diodes, make sure that you have the cathode at the correct end. Once replaced, re-assemble and test the power supply. There's another important rule here: you should never test the power supply until it has been re-assembled.

The only other power supply component which can be investigated is the transformer. This is the largest component in the power supply, and as such is easily identifiable. It is roughly cube-shaped, and has several wires coming out of it which are then soldered to the board.

We can only perform two tests on the transformer. Firstly, we can test for continuity on the primary winding, which is the input to the power supply on the circuit board, where the negative and positive wires from the mains plug are soldered. You should find that electricity can flow here. If you don't, then I'm afraid that it's not worth repairing, and you'll have to go out and get a new power supply.

The other test we can carry out is to check the soldering of the secondary windings into the circuit board. Ensure that these are clean and securely fixed, and if not, re-solder them, re-assemble the casing, and test. If you have not succeeded in repairing the power supply after these checks, then I'm afraid you'll probably have to pay out and buy another one.



Work SHOPPER Workshop

Is your Amiga poorly? Worry not, because help is at hand – month by month, Wilf Rees is here to show how you can service and repair your computer yourself

WD40. Afterwards the surfaces should be wiped as clean as possible using dry lint-free cotton. Sticking keys can be treated in much the same way.

The reasons for mouse malfunctions can be broadly divided into two categories: either the mouse is faulty, or the Amiga is. First of all, you should try using a malfunctioning mouse with someone else's Amiga. If it still misbehaves, then the fault must be with the mouse. If it works with your friend's machine, then your Amiga is faulty, and we will look at that option later.

There are several mouse repairs you can carry out yourself. The mouse is driven by a round rubber ball, which runs on three nylon rollers. The commonest fault with the mouse is a build-up of grime and dirt on the ball and the rollers. To solve this, first remove the two self-tapping screws on the base of the mouse, and separate the two halves. Two small black self-tapping screws hold the ball mechanism onto the circuit board. Remove these, then lift the mechanism clear of the circuit board.

ALCOHOL IN MODERATION

You will see the rollers clearly, each with a ring of black dirt around the centre – brought on by hours of use. Do not buy any of the proprietary fancy brands of mouse-cleaners, but instead pop down to your local chemist's, and ask for a bottle of 'Isopropyl Alcohol'. Soak a cotton bud in the alcohol, and work it over the surface of the rollers. The grime will come off with very little effort. Place the operating ball in a square of scrap cotton, and clean the ball with a few more drops of the alcohol. Re-assemble and test the mouse – you should notice far smoother movement of the pointer.

The cable from the mouse is attached to the mouse circuit board via a push-on connector and a separate soldered cable. Other than to check the wires are still intact at the connector, there is little more you can do here. However, it is not uncommon for the two micro-switches to develop faults. Once these start to misbehave, they can sometimes be resuscitated with a quick squirt of WD40, but often this is a short-lived measure, while getting an appropriately-sized replacement is not always easy. You could, of course ask your local dealer if he has a dead Commodore mouse lying around that you could buy cheaply, in which case this can be a source of several bits. But remember, with used merchandise, you do tend to get what you pay for...

If you are of the same persuasion as myself, and never throw anything away, you'll stick your duff mouse in a drawer for when your new one gets poorly. And finally, there's just one last mouse-fixing tip I should pass on: if you fail to repair your mouse yourself, it's probably not worth taking it to your dealer to pay for 'proper' repairs – mice are so cheap today, it's far more economical to buy a new one.

While we're on the subject of buying power supplies, you should take Dave Cooper's advice and spend a little more on one of the higher power versions available. 40% of repairs to the Amiga 500 involve power supply problems, and the one supplied is not really up to the task of powering all the additional hardware that you lot are bunging into one port or another!

A FRIEND IN NEED...

One of the advantages of being in the electronics trade is being able to replace most components from stock, and then try out the repair straight away. Unfortunately, not having a huge selection of spare parts to hand causes problems for the average punter, so this is where the buddy system can come into play. Often the only way you can detect whether a component is faulty or not is to try another, and that's when you find out who your real

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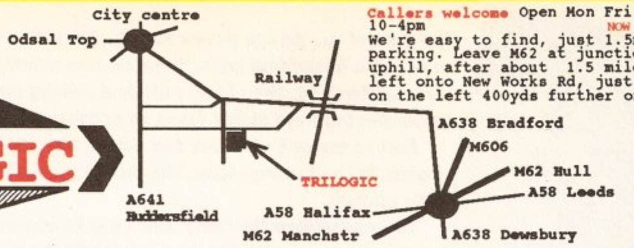
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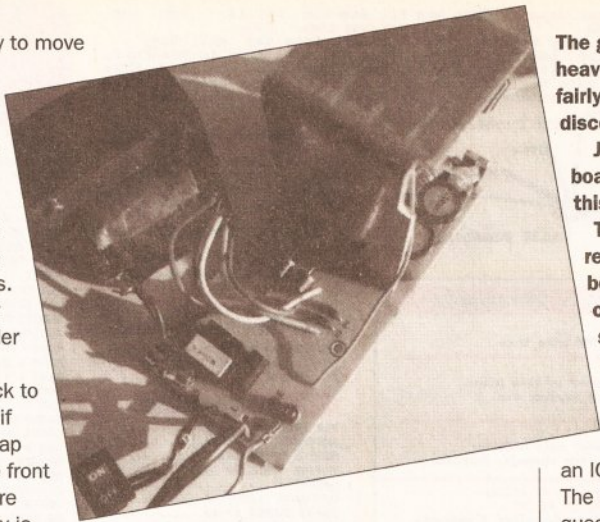
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friends are. The best way to move forward is to make an arrangement with a pal, allowing each of you to try out components from the other's machine in the event of problems.

Now there are snags to this ploy. Firstly, there is the issue of warranties. If either your own or your mate's Amiga is still under warranty, then the only recourse is to take it back to your dealer. Remember, if the silver seals which wrap around the seams of the front and rear of your Amiga are broken, then the warranty is void. Secondly, you may have come to the conclusion, that, say, the 68000 CPU is blown, so you decide to try your mate's chip in your machine. It could be that your 68000 CPU is blown, but the reason for that could be a short on the external edge connector, with the result, on power-up, of two blown 68000s. The moral of this story is to always be very sure of what you are doing, or be prepared to fork out hard-earned shekels. The other warning we should make at this point refers to the handling of CMOS or TTL chips.

You have probably heard before about the need to exert care when dealing with these delicate components, but familiarity breeds contempt. So, to reiterate – integrated circuits (or 'ICs') are sensitive to two particular things: static electricity, and rough handling.



The guts of the Amiga power supply. Remember to test its weight: if it's as heavy as a household brick, then we can attempt some repairs – but if it's fairly lightweight, then keep out. And always ensure everything is disconnected from mains when examining the power supply.

Just to the left of where the cables from the on/off switch join the circuit-board, is the internal fuse. The two large diodes can be seen in the centre of this picture.

To re-assemble the unit, take care to ensure the component parts are replaced in exactly the way you found them. There are moulded slots and bosses inside the power supply case which hold the components in place – check to ensure these are correctly aligned before tightening the four screws. If the power supply does not appear to be going together smoothly and snugly, do not force it together by continuing to tighten the screws. If it won't go easily, take it apart and check again that everything is intact.

BURNT CHIPS

As you move about doing your own thing, you gradually accumulate static electricity in your body. This phenomenon is particularly noticeable if you choose to wear synthetic-soled shoes, and have nylon carpets. No doubt you will have felt the occasional 'shock', when you touch something that earths the charge. Cars can accumulate the same static charge, and often take to disposing of it, via you, when you take hold of the handle. This explains those really naff dangly things that some motorists hang from the rear bumper of their cars, only to find that after about twenty miles the daft thing has worn away, and doesn't reach the road.

Static electricity, when built up in your body, is desperately seeking some way to escape, and the pins of an IC are a favourite escape route. The difficulty here is that the pin in question may be designed to respond to very low voltage fluctuations, so up to 20,000 volts of static can (if you'll excuse the pun) come as a bit of a shock. The result: a wrecked IC. The simple precaution is to earth yourself prior to carrying out any work on electronic components. This can easily be achieved by grabbing a tap or radiator in the house, thus releasing the charge to ground. Electronics workers in the industry have straps running from their wrists and leading directly to an earth.

Rough handling is the second biggest cause of damage to ICs. The pins are very easily bent or broken, and extreme care must be used when removing or replacing them. Nearly all of the ICs in the 500 are of the two-sided variety, and removing an IC is not difficult – providing you follow this procedure:

1. Discharge any static in your body to earth, as described in the preceding section.

2. With a flat-bladed screwdriver, carefully push the blade under one end, and gently lever the IC against its holder, so that the pins move about a millimetre out of the socket.

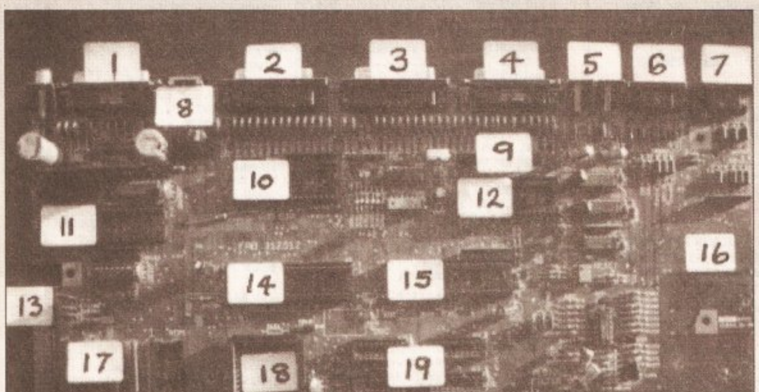
3. Repeat at the other end of the IC.

4. Carry on with Steps 2 and 3 until the IC is free of the holder.

5. Making sure that all pins are clear, pick the IC up with thumb and middle finger, lifting it vertically away from the holder.

6. Place the IC in a safe place – preferably stuck into the special black foam used for this purpose. Failing that, gently push the IC into a piece of soft polystyrene: a ceiling tile, for instance.

KNOW YOUR ENEMY



Here is an A500 motherboard, identifying the key components. The ICs have been removed to show the socket holders clearly. The components often have nicknames, but for purchasing from suppliers, it is best to quote the correct reference as given in the official service manual. Along with the name of each part, I have given a brief description of its function in the Amiga.

1. RGB monitor connector. Used to connect your Amiga directly to a monitor offering RGB analogue input.

2. Parallel port. Used to connect several devices, especially printers. The parallel port is a female socket, and an important characteristic of this port is that pin 14 (bottom left) supplies +5V.

3. Serial port. Also used to connect printers, as well as other devices. Pins 9 and 10 carry +12V and –12V respectively.

4. External disk drive connector. One of the commonest upgrades available for the A500 – an external disk drive – uses this port. It has no other uses other than as a combined source of both +5V (pin 12) and +12V (pin 23).

5. Left and right stereo sound output. The phono connectors deliver left and right audio output. These can be plugged into a monitor, or alternatively, into the Aux or Tape input of a hi-fi system, to give excellent sound quality.

6. Joystick port. Another way of communicating with the Amiga, via a 9-pin 'D' connector. This port is also referred to as 'Joy 2'.

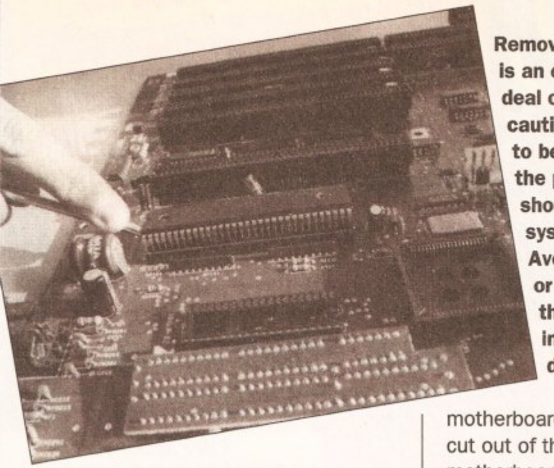
7. As 6, except this port is known as 'Joy 1', and is primarily used for the mouse. Also suitable for a light-pen.

8. Power input. The Amiga receives 12 and 5 volts from the external power supply via this port, these being the voltages required to drive the system.

9. Internal floppy connector. A 34-pin connector which receives data from the internal floppy drive. A short ribbon cable connects this and the drive itself.

10. Odd CIA 8520 I/O. This is one of the major components in your Amiga, along with Item 12 which is the **Even CIA**. These two chips account for 60% of Amiga repairs, because they deal with the parallel port connector, joystick/mouse connectors, front panel LED, internal control lines, keyboard, serial port, floppy drives, and internal timing.

11. Denise 8362. Denise is the custom graphics chip which controls resolutions, colours, sprites, text and TV/monitor software. Unique to the Amiga, Denise has been superseded by the Super Denise



Removing an IC from the holder is an exercise requiring a great deal of care. Antistatic precautions need to be adhered to before commencing, and the process of removal should be carried out in a systematic and gentle way. Avoid any violent actions, or heavy forcing, and allow the pins to exit the holder in as near a vertical direction as possible.

REPLACING AN INTEGRATED CIRCUIT

When you buy a new IC, it is not really ready for immediate placement in your computer. There are a couple of things you need to do first:

1. Discharge yourself to earth before touching the IC.

2. Holding the chip between thumb and middle finger, carefully press all of the pins on each side down against a hard surface. This procedure ensures that the pins are pointing downwards at right angles to the body of the IC. You will find this makes the insertion into the holder much easier, as the legs of ICs are slightly splayed when new, and will not fit comfortably into the holder.

Now check the correct orientation of the IC with the socket. On all of the sockets on the A500 motherboard, there is a semi-circle cut out of the rectangular print on the motherboard at one end of the IC location. This corresponds with a similar notch on the IC itself. Ensure you have these two correctly aligned.

Once you have done this you must carefully align the pins of the IC directly above their sockets. Gently place the chip on top of the holder, checking that all the pins are in place, and, with even pressure over the whole surface of the IC, push it into place. Check that all pins are correctly located in their 'home' sockets before giving the chip a final firm press with both thumbs, once again, spreading the pressure equally across the top surface.

READY FOR ACTION

Most of the details I have described here will enable you to start checking up on some of the components that make up the Amiga. Some of them are simply background material for repairs which will appear in the forthcoming articles, when we go inside the Amiga, and start poking around its internal workings. So, you should keep all these articles as a complete reference, as we will refer to particular operations in the future, but not necessarily repeat all the details of the procedures.

There's just two more points to make. Firstly, remember all I have said about safety. Any attempts you make to carry out repairs are entirely at your own risk, and *Amiga Shopper* cannot be held responsible if (heaven forbid) your Amiga ends up as a melted heap of smouldering plastic. As regards your own personal safety, you should always ensure that mains electricity and humans are kept well apart when investigating faults.

And secondly (on a somewhat related topic), try to work in a well-lit and clean environment when you start mucking around with your precious kit, and not in some dim, mucky corner of the garage. Good luck, happy fault finding, and see you next time! AS

which offers extended graphics capabilities.

12. Even CIA 8502. See Item 10.

13. 86-pin connector (edge connector). Accessed by the removal of the clip-off protective cover. The favourite expansion port of third-party developers.

14. Paula 8364. The sound controller chip, with four voices (configured in stereo), nine octaves, I/O controls for disk data and ports.

15. Gary U5. Gary handles the keyboard reset control, (hence the wire for keyboard control of ROM sharers) bus control signals, decodes address signals, and contributes to floppy circuitry and 68000 signalling.

16. Motherboard revision data. Specific information about the particular version of the A500 you have, plus, on some machines, a daft reference to a 'Rock Lobster'!

17. 68000 CPU U1. The Central Processing Unit – the heart of your machine. This can be upgraded by fitting accelerator daughter-boards, holding the 68020, 68030 and 68040 Motorola CPUs.

18. Agnus 8370: Fat, Fatter, or Superfat. The animator, generator of the system clock, and generator of control signals for video RAM and expansion RAM card. Agnus takes over from the CPU for controlling graphics, allowing the 68000 to concentrate on other tasks.

19. Data path. These four ICs act as buffers for information as it is being processed from the custom chips. Rarely a source of problems.

20. ROM Kickstart U500. This is what gets the show on the road. It can be upgraded to the next version, or fitted with a daughter-board to share more than one version.

21. RAM chips. 16 surface-mounted memory chips providing 512K of RAM, 32K each.

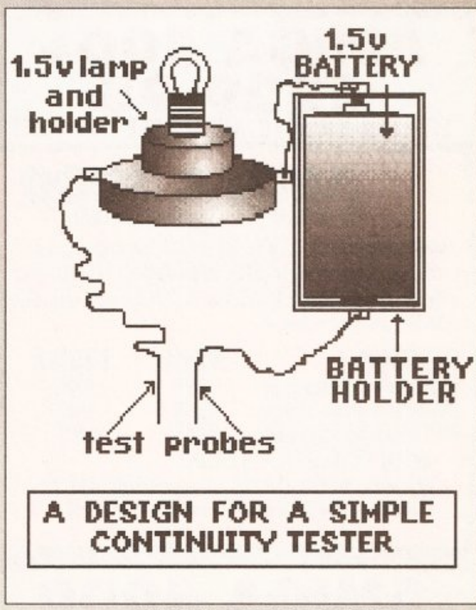
22. Internal expansion connector. Intended initially as a memory and real-time clock expansion port, but developed into a 56-pin connector for all manner of add-ons. Again, the facility is provided for taking voltage output: pins 1 and 2, and 51 and 52 carry +5V. Pin 55 carries +12V.

CHECKING YOUR CONTACTS

You may already possess a test meter (and understand the basic principles of using it), but most people have not, in which case this simple continuity tester will prove invaluable for checking both wiring and components.

Construction is fairly simple, requiring just a few components, all of which can be bought for about £2 at a shop like Tandy, or any similar electronics retailer. You will need the following:

- A standard 1.5V torch battery.
- A similar battery holder.
- A 'batten' lamp holder.
- A 1.5V screw-in bulb.
- About 1m of single core wire.
- Two rigid probes, or a miniature crocodile clip plus a large needle.



When it comes to electrical circuits, you can't get them much simpler than this one!

MAKING CONNECTIONS

Cut a short length (about 10cm) of cable. Solder one end of this to the positive end of the battery holder, and the other end to one of the terminals on the bulb holder.

Divide the remaining cable into two equal lengths. Solder one end of one length to the negative terminal of the battery holder. Solder one end of the other length to the second terminal of the lamp holder (as in the picture, above).

Screw the bulb into the lamp holder, and place the battery in the battery holder. Touch the two remaining ends together. The bulb should light. If it does not, go back over each of the above instructions and check each stage.

If you don't have 'proper' probes, attach a miniature crocodile clip to one of the free ends (this is usually a screw fitting, but may require soldering), and a darning needle to the other. A needle makes a useful probe, as the core of the wire can be passed through the hole in the needle, and soldered. Alternatively, you can simply fix a needle to each end.

Using the combination of needle and crocodile clip allows you to attach the crocodile clip to any end of a circuit being tested, freeing one hand for other actions. If you want to improve the tester further, you could strip some old single core cable, and 'sleeve' the soldered joints at the probes. This reduces the chance of you accidentally measuring the wrong part of the circuit.

THE TESTER IN USE

Many tests can be carried out using this simple device. By clipping the crocodile clip to one end of a cable, and touching the other end with the other probe, current should flow along the cable, and the bulb will light. Any breaks in the circuit will prevent the bulb from working.

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I've got to admit that I'm still in two minds about the *PowerScan Colour*. One half of me is saying that £239 is a small price to pay for the ability to scan in colour. But the other half is putting that price into perspective by reminding me that for the same money I could go out and buy, for instance, a colour TV, or a CD player, or a video recorder.

My gut feeling is that a scanner like this has to be pretty impressive to justify this sort of outlay. And even then I think it's fair to say that it's only worth the money if you have a real use for the product.

So, what would you use it for? Well, probably the most obvious reason why you might want to transfer a colour image from paper onto the screen would be for multimedia purposes – anything from a simple floppy disk slideshow presentation, right up to a full-blown CD-ROM multimedia application put together with an authoring system.

The images you intend to scan might be photographs containing many colours and subtle shades, or they might be illustrations or cartoons containing just a handful of colours. In either case, you will want the colours in the screen image to closely match those of the paper picture. So, for screen work the requirements of a colour hand scanner are simply stated – in essence, you want the picture on the screen to look exactly the same as the picture on paper, always allowing for a certain loss of resolution and slight differences in colour due to the limitations of the screen display.

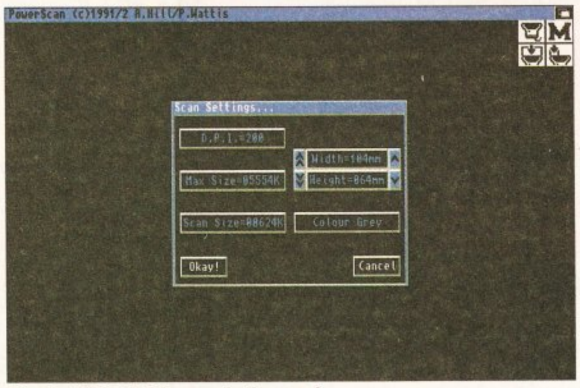
THE CAMERA NEVER LIES?

You will almost certainly need to 'process' the image once scanned. It is likely to be too big or the wrong shape, so scaling and cropping facilities are required. You may need to brighten or darken the image, adjust the contrast, alter the RGB values, enhance its appearance by applying a dither pattern, reduce or increase the number of colours being used – all these things, and many more, will be important to the 'multimedia artist'. Should you expect the scanning software to provide these facilities, or is it more sensible to buy some dedicated image processing software? The correct answer is probably the second of those two options, but if the scanning software is able to do a certain amount of image processing, so much the better. Provided it makes a decent job of it, of course.

Another use for a colour scanner is desktop publishing. It can be argued that a colour hand scanner requires fewer features for DTP than for screen work. Essentially all you really want for DTP is to be able to scan a coloured image and then save the file, with all the colour information, in a format that can be imported by your desktop publishing program. What happens after that – image manipulation and output quality, for example – is the responsibility of either the DTP program, the Amiga, the printer driver, the printer, or any combination of the four.

A BIT ABOUT BITS

Now you may have read in news reports or adverts that *PowerScan Colour* scans in 4,096 colours. And you may know that the Amiga's HAM screen mode can display 4,096 colours. But despite the numbers being the same, the 4,096 colours the *PowerScan Colour* creates are not the same as the 4,096 colours HAM can display. Before I get down to actually describing the kit, I think it would be be best if I explained about these 4,096 colours.

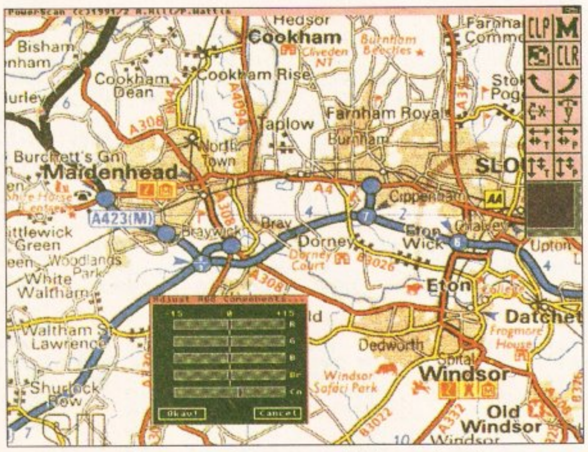


The height, width, resolution and scan mode are specified in the uncluttered Scan Settings requester

PowerScan Colour is a '12-bit' scanner. Now, there's no need to wince and worry that I'm getting too technical for you. All '12-bit' means is that the number that defines the colour of each pixel on the screen is held in 12 bits or 'binary digits' of computer memory. Because memory is binary – a 'base 2' numbering system as opposed to our normal 'base 10' numbering system – the biggest number that can be held in 12 binary digits (bits) is 2 to the power 12, or to put it another way, 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2, which works out as 4,096.

HAM screen mode, which professes to be able to display 4,096 colours, can actually only display 16 true colours – 'true' colours being colours that you can define for yourself – and that's because (leaving the new AA chipset aside for a moment) the Amiga holds the value of each HAM colour in four bits of memory, and 2 to the power 4 (2 x 2 x 2 x 2) equals 16. HAM is able to display more colours by some special wizardry called 'Hold And Modify'. In a nutshell this means that the colour of each individual pixel is calculated from the colour of the pixel to the left of it, and the information which tells the Amiga how to modify the colour for the new pixel is stored in two further bits of memory, which comes to six bits in total.

What the Amiga community has called simply 'HAM' for several years is now being called 'HAM-6', the '6' meaning that it uses six bits to hold the colour of each pixel. The new AA chipset (in the Amiga 1200 and 4000) is able to use eight bits of memory for each HAM pixel – six bits to store the colour number (so 64 true colours, 2 to the power 6), plus two more bits to store the 'modifications'. This new 'HAM-8' screen mode is capable of displaying hundreds of thousands of colours on the screen at once – hence the 256,000 number you may have read about. Strictly speaking this is a severe underestimate because each pixel on a HAM-8 screen can (in theory) be a different colour, so on a Super-HiRes Interlaced screen (1280 by 512 pixels) more than 650,000 colours are possible.



Images containing only a few colours can be converted to 16 colours and displayed on a HiRes interlaced screen, where they look pretty impressive. Note the Adjust RGB requester that allows you to experiment to your heart's desire with the colour components, the brightness and the contrast

Most images, even scanned photographs, don't contain anywhere near this number of colours, so the fact that the *PowerScan Colour* is a 12-bit (4,096-colour) scanner is not as much of a handicap as it may at first appear.

OK, so we've established that the *PowerScan Colour* scans in 4,096 true colours, but the Amiga cannot display 4,096 true colours.

Pre-AA chipset Amigas (Kickstart 1.x, 2.x) can display up to 32 true colours in LoRes and 16 true colours in HiRes. (AA chipset Amigas can display up to 256 true colours in any resolution.) To display the scan on the screen *PowerScan* converts the 12-bit colour data into a HAM-6 screen image, although it retains the 12-bit data in memory so that any actions you perform on the image are calculated from the original data rather than the screen image.

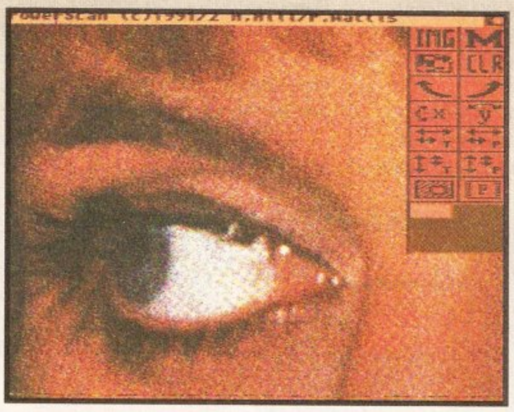
The reason I've explained about 12-bit and HAM is so that you understand that the picture you see on the screen after scanning something with *PowerScan Colour* is not exactly what is in memory – what you are seeing is the image after it has been converted to fewer colours. However you can save and use the 12-bit data, but more on that later. Let's now look at the package itself.

THE POWER OF TWO

PowerScan Colour comes in two models. The interface for the Amiga 500 and 500 Plus connects to the expansion port on the left-hand side of the machine. It has a through port so that anything else you want to plug into the expansion port can be used at the same time, such as extra memory or a hard drive.

Despite Power Microsystems assuring me that "it will all be sorted out", it would be wrong of me not to tell you that there were design problems with the interface that was sent to me to review. The plate which covered the through port could only be removed by unscrewing the interface cover, unscrewing the printed circuit board (or 'PCB') and unscrewing two tiny nuts. This is both fiddly, and potentially dangerous because the slightest slip could end up in a damaged PCB. Power says that the design has now been changed so that the through port cover can be removed by unscrewing two screws on the outside of the interface.

A more worrying design fault is the fact that the PCB is held in the interface by two diagonally-opposite screws on two raised bushes. Very slight pressure on one of the 'unfixed' corners caused the bushes to shear away from the case of my review model. After reporting this to Power, the manufacturers were contacted. They tried the same







After scanning in colour at 200 dots per inch, the image you first see on the screen may look a little rough and ready (above left). But if you run the image through some image processing software and rescale it (above centre), you can get some fairly photographic-looking images, even in HAM. *PowerScan* itself can rescale the image (above far right) but the results are generally not as good as using dedicated image processing software like *Art Department Professional*

Colour me good

Long-awaited and much-advertised, the new Power hand scanner offers more than 4,000 colours for less than £300. Jeff Walker asks: can a scanner this cheap really deliver the goods?

experiment and got the same result. Power says the bushes have now been strengthened, but a number of interfaces with this design fault have already been sold, so if you've got a *PowerScan Colour* and find one day that the edge connector is wobbling about in the case, don't panic, it's not your fault – just phone Power and ask for a new one.

The scanner head lead plugs into a socket which is thoughtfully situated on the front of the interface.

The interface for the Amiga 1500/2000/3000/4000 is on a half-length card and fits into any available Zorro slot. A bracket is supplied that replaces the slot cover at the rear of the machine, and the scanner head lead plugs into a socket in this bracket. The only slight problem I've experienced with this Zorro card interface is that the bracket is not that strong, so it tends to bend inwards a bit when you try to push the scanner lead into its socket. But then the odds are that once the scanner head is connected you'll leave it connected, just as you might do with a printer in the parallel port, for example. So, as I said, it's only a slight problem.

Here ends the differences between the two models. Neither of the interfaces will fit the Amiga 600 or 1200, but a PCMCIA (smart card) version is planned. But it will be a while yet, so don't hold your breath.

HEADS YOU WIN

The scanner head is the common 'T' or 'hammerhead' shaped unit, with a slightly raised lip at the rear which gives you something to pull on. (If you look at the scanner head's profile it looks just like a Le Mans racing car.) The lead is a generous 6ft long, so there's plenty of freedom even if it has to stretch round the back of a 2000, 3000 or 4000. The head has a really solid, well-built feel to it, and seems much more sturdy than a monochrome hand scanner.

The scanner itself is quite a sophisticated device which can operate in four modes. The one you'll probably be using the most is CG mode (Colour Grey), which is the 12-bit mode that scans in 4,096 colours. But there's also MG mode (Mono Grey) which scans in 64 true greys (6-bit).

The third mode, labelled D/T on the scanner (for Dithered/Text), is actually two modes depending on which halftone (dither pattern) mode you have selected. If you set the halftone switch to the 'square' position, it scans in 1-bit monochrome (black-and-white) – and this is known as the 'Text' mode. But if you set it to any of the three 'circle' positions it creates an image that contains just eight colours, but dithers the image to give the appearance of up to 4,096 colours. This Dithering mode might be extremely useful if you are printing the images on a printer that uses seven inks, because the colours on the screen will be the same as the colours in the printer – black, red, green, yellow, blue, magenta, cyan. The eighth colour is white, which is actually 'no colour', and will (usually) be the colour of the paper you are printing on.

The advantage of this is that what you see on the screen will look very much like what you get printed. But 7-colour printers are expensive and most of you who own colour printers will have 4-colour ones, so this mode is of limited use. But it's there if you need it.

The Scan Mode and Halftone switches are on the left-hand side of the scanner; on the right-hand side are the brightness wheel and the resolution switch. Monochrome hand scanners normally have four settings marked for 100, 200, 300 and 400 dots per inch ('dpi'), but because of the different scanning modes supported by this colour scanner, the switch is marked 1/4, 1/2, 3/4, 1 – quarter, half, three-quarters, and maximum size. In Colour Grey mode these settings correspond to resolutions of 50, 100, 150 and 200 dpi; in the other three modes (Mono Grey, Dithered, Text) the resolutions are 100, 200, 300 and 400 dpi.



***PowerScan* handled this subtly-shaded cartoon and converted it to 16 colours quite successfully. OK, it needs a bit of cleaning up, but that's a piece of cake compared with drawing the cartoon from scratch in a painting package**

The scanner is operated by a toggle button on top of the head. After setting the software to scan, the scanning light illuminates, but the scanner won't start reading data until you press the scanning button. You press it once to start reading data (a red light shows that the button is on), and press it again to

stop reading data – you don't need to hold it down while scanning as you do with some other systems.

The scan continues as you slowly pull the head over the original image, until either the specified scanning height is reached, or (if you want to stop the scan earlier) you hit the left mouse button. There's no light on the scan head to inform you that you are in danger of pulling too quickly, but after a few attempts you soon get to learn what a slow, even pull feels like.

THE BIG PICTURE

The *PowerScan Professional 3* software is a development from the earlier version supplied with Power's monochrome hand scanner. This one piece of software now serves both the colour and monochrome scanners, automatically recognising which model you have attached and appropriately altering the options available to you.

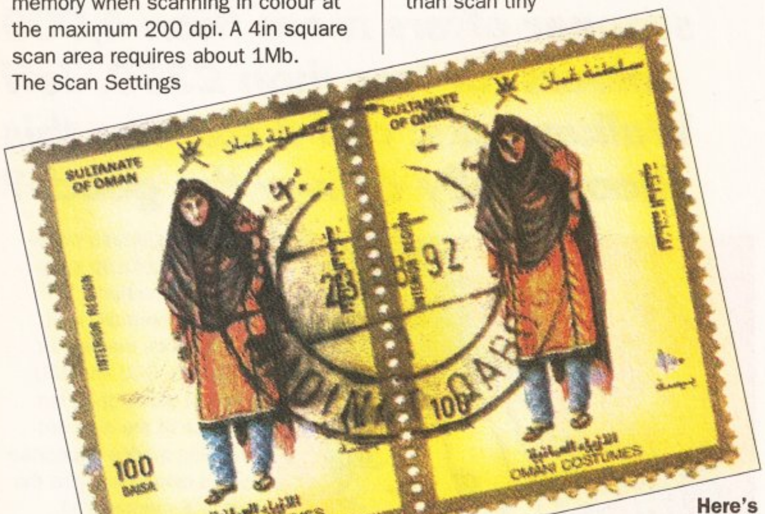
The first important point you need to understand about *PowerScan Colour* is that 12-bit graphics data eats up a lot of memory, and so does the HAM screen image. The default scan size – 104mm by 64mm (about 4in by 2.5in) – requires more than 600k of memory when scanning in colour at the maximum 200 dpi. A 4in square scan area requires about 1Mb. The Scan Settings requester gives you this information, as well as a Max Size figure in kilobytes so that you can quickly see what you can and cannot do.

Although *PowerScan* will happily scan to expansion ('Fast') memory if you have some fitted, it requires a contiguous area of memory in which to hold the data. So if, for example, you have 1Mb of graphics ('Chip') memory and 1Mb of expansion memory, the largest contiguous chunk of memory will be a portion of one of these two 1Mb 'banks' of memory. In this hypothetical memory situation, the *PowerScan* program will load into expansion memory as a matter of course, and the screen it opens will use a bit of graphics memory, thus taking the largest chunk from each type of memory.

The point I'd like to make here is that although the advertising says that the minimum requirement is 512K, a more realistic minimum requirement – the amount of memory you will need to do anything other than scan tiny postage stamp size pictures – is either 2Mb of graphics memory, or a smaller amount of graphics memory and 1.5Mb of expansion memory. I used *PowerScan* on a 512K graphics memory Amiga 500 with 2Mb of expansion memory, and it was a little frustrating having to keep clicking the "Not enough memory" requesters. After increasing the expansion memory to 3Mb, it felt a lot more comfortable and I was able to scan some decent-sized images. And, to top it all, on a 9Mb Amiga I was able to scan a 4in by 24in strip of the Year Planner that hangs on the wall next to my workstation.



Due to only the new machines having the AA chip set, the convert to 256, 128 and 64 colours options will only be available if *PowerScan* is running on an Amiga 1200 or 4000. On any other Amiga you get the option to convert to 32 colours or fewer. Nevertheless, on pre-AA chipset machines you can still get some pretty good on-screen results by converting to 16 colours, scaling and displaying in HiRes Interlaced mode



Here's a good *PowerScan* application idea: the beginnings of a pictorial postage stamp database

If your main use for *PowerScan Colour* will be to create 640 by 512 (-ish) screen-size images for multimedia work (which is approximately what the default scan size of 104mm by 64mm produces at 200 dpi), then you'll just about get away with 1Mb of contiguous free memory after *PowerScan* has loaded. But memory will fragment very quickly indeed, and you'll find that you'll almost certainly have to reboot the Amiga every time you want to do another 104mm by 64mm scan.

So you need a fair amount of memory. And, unless you are running an accelerated Amiga, you will also need a fair amount of time.

WORTH THE WAIT?

It takes ages for the 12-bit data to be converted to a HAM screen display, about six minutes for an image of the default scan size on a standard Amiga 500. And because you are working on a HAM screen (LoRes by default), menus and requesters are slow to appear and sluggish to operate. Naturally, on a faster Amiga you don't notice so much, but if you've used any HAM painting package on a standard Amiga 500 you'll know exactly what I mean by sluggish. There's nothing that can be done about it, so *PowerScan* cannot be blamed.

In Colour Grey and Mono Grey modes the screen display remains blank while you do the scan, after which the *PowerScan* screen reappears and you are, erm, 'entertained' by an animated stopwatch pointer for a while. Exactly how long the 'entertainment' continues depends on how big the scan was. If the scan was A4 length, there's plenty of time to walk down the shops, buy some coffee, walk home, make the coffee, drink it, wash up, walk the dog, read the manual, and have forty winks. Again, *PowerScan* can't be blamed; it's having to convert something like 3Mb of 12-bit data into a HAM image, and this takes time. Only a faster processor can speed it up.

In Dithered and Text modes you get a 'real time' scan – as you pull the scanner over the image the data is transferred directly to the screen – and there is no wait after scanning.

SCREEN MODES

PowerScan will work in any screen mode which is supported by the monitor and particular version of the operating system you are using.

The HAM screen images it produces look best in HiRes Interlaced (640 by 512), especially scans of photographs, but this screen mode is available only to Amiga 4000 owners (the *PowerScan* hardware doesn't currently fit the 1200). Photographic images generally look fairly naff in LoRes (320 by 256), but an awful lot better in LoRes Interlaced (320 by 512). Selecting this screen mode alters the shape of the screen pixels, giving the image a squashed appearance, so you need to scale horizontally by 50 per cent to compensate. *PowerScan* is able to do this, and the results are quite good.

But if the 12-bit data is saved (as an IFF24 file), imported into *Art Department Professional*, rendered as HAM on a LoRes Interlaced screen and scaled horizontally by 50 per cent, the resulting image is far better than the one created by *PowerScan*. The image is still about twice the size of the original, so it may appear a bit blurry, but scaling again by 50 per cent in both directions will sharpen it up and produce screen images that are surprisingly faithful to the originals. This "scale and scale again" technique does not work very well in the version of *PowerScan* I am

reviewing (3.15), but the developers are working on an image smoothing option that does the same as *Art Department* and other dedicated image processing software.

Scanned images can be converted from HAM to any other number of colours supported by your hardware. For ordinary mortals this means 2, 4, 8, 16, or 32 colours – Amiga 4000 owners can also convert to 64, 128 or 256 colours.

The screen images can be saved in the standard IFF graphics format, or the full 12-bit data can be saved as an 'IFF24' file, which is really just a 12-bitplane standard IFF-ILBM. *PageStream 2.2* imports these without problem, as does Soft-Logik's *BME* bitmap editor and ASDG's *Art Department Professional*. *Professional Page 3* imports them but doesn't understand that they are 12 bitplanes, and so creates a bit of a mish-mash on the screen and printer. The developers are currently adding an option to *PowerScan* to save the data as proper 24-bit files which *Professional Page* should not have any problems with.

You can also save the image in TIFF or GIF format. TIFF preserves the full 4,096 colour information, while GIF is a 256-colour file format. I've had little success with either of these two file formats as exported by *PowerScan*. *PageStream* loads the TIFFs but the image is of a very poor quality; load the TIFF into *BME* and you get a pretty awful 16-greys representation that suggests the colour information is not correct. *ADPro* loads *PowerScan's* TIFFs, but when you render them you get garbage for some reason.

ADPro refuses to load *PowerScan*-exported GIFs, complaining of an error early in the file. *PageStream* loads them, but they appear to be corrupted. *BME* gets part way through the load and then goes to sleep. A PD GIF viewer also suggested that *PowerScan's* GIF files "may be corrupted", and judging by what it displayed on the screen, there's certainly something wrong with them.

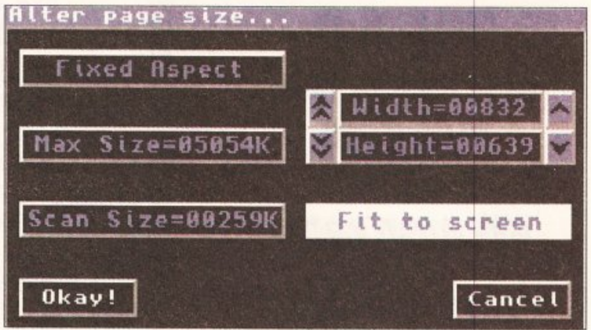
Needless to say the developers have been informed of this minor problem and are working on it.

PROCESS THAT IMAGE

PowerScan's image editing and processing facilities are fairly rudimentary. There is a bunch of drawing tools which let you create lines and shapes on the screen, in any colour of the current palette, filled if you like with a solid colour or a selection of patterns. If you don't own a HAM painting package then I suppose these tools might be useful, but you'd be better off loading the images into *Deluxe Paint 4* and working on them there.

Part of the image can be cut out as a brush and stamped down elsewhere, or saved in IFF-ILBM format for later use.

Images and the contents of the clipboard (the current brush) can be scaled by 50 per cent in either direction, and you can also flip them, rotate them by any angle and skew them. Currently there's no way to rotate or skew to a specific angle – you have to do it by eye by looking at the rotated box *PowerScan* shows you on the screen. This is something else that the developers say will be improved in a later version.



***PowerScan* is able to rescale the image to fit a specified size (in pixels), either keeping or ignoring the original aspect ratio**

For black-and-white line art images there are Darken, Lighten and Cleanup (remove isolated pixels) options. These also work on colour images, but produce unusual results. The only real image processing feature for colour images is the 'Correct RGB' requester that allows you to adjust the amount of red, green or blue in the image. There are also sliders for Brightness and Contrast control. These processing tools don't work too well on HAM images (on the whole you have to wait quite a long time to find out that your fiddling has only made things worse). But they are fairly useful on images that have been converted to fewer colours because they work in real time – as you slide the sliders, so the colours on the screen change.

You don't always need to process a colour scan, as often they look fine as they are. But if you do need to enhance an image, you'll need software that is far more powerful than *PowerScan* – say, *ADPro* or *ImageMaster* – and the memory to be able to work with 24-bit data (I'd say that 4Mb is a realistic absolute minimum for this).

HALF A MO...

As with the earlier monochrome version of *PowerScan*, wider scans can be achieved by scanning the left half of the image onto the screen, and then the right half into the clipboard. There it becomes a brush attached to the mouse pointer, and can be positioned and stamped down next to the left half.

Naturally this requires more memory, and also the patience of a saint because it is possibly the most fiddly, frustrating and time-consuming operation ever invented. It can be done, but don't expect the two halves to ever match perfectly.

It seems a bit pointless talking about greyscales in a colour scanner review, but I'd better point out that in Mono Grey mode this scanner can operate at up to 400 dpi and can save all six bitplanes, which is 64 true greys – these can be displayed in all their glory on AA chipset machines. The 64-greyscale *PowerScan*-exported images were imported by every DTP application I tried – *PageStream, Professional Page, PageSetter II, ADPro, BME, Touch-Up* – but they all decoded them incorrectly, spattering little white dots over the image. *PowerScan* re-imports these 64 greyscale images and displays them perfectly in 16 colours.

HUE AND CRY

Is it *PowerScan* exporting (and therefore importing) them incorrectly? Or is *PowerScan* doing it right and has everyone else got it wrong? Either way it's a problem, but only a small one, because the '16 greys' images *PowerScan Colour* produces are far superior to those produced with any of the monochrome hand scanners, including Power's own monochrome hand scanner. This is because it scans in 'true' greys rather than black-and-white dither patterns that have to be converted to grey – this results in larger, sharper images.

The colour images are superb considering the price of the kit and the fact that it is restricted to only 12 bits of colour data. You should keep in mind that an 18-bit hand scanner will cost you twice the price and require more memory; a 24-bit flatbed scanner will cost three times the price and require even more memory. But it has to be said that, for screen work, better results are obtained after loading the 12-bit data into some image processing software and rendering it into HAM or 256 colours (or whatever) that way, rather than using *PowerScan's* conversions.

This, like a number of other features, may change in later versions. And there's the rub. The software is still a little buggy – it has crashed on me several times – and a number of features have been poorly implemented. I've spoken to the developers and I know that a fair number of things are going to get better – in fact during one week I saw three software upgrades. Power has a good track record for supplying free software upgrades to those who ask for them. This doesn't excuse the company from selling buggy software, but at least you won't have to pay extra for the 'fixed' version.

PowerScan Colour works well enough to be useful in my DTP office, and there is currently no cheaper way to transfer coloured images from paper to the computer. It isn't as good as a 24-bit flatbed scanner, of course, and it would be unfair to compare it against one. In fact there's no other Amiga scanner that it can be objectively compared with. But for those who have a need for colour scanning and can't afford a flatbed, *PowerScan Colour* is a less expensive option. AS

SHOPPING LIST

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Woburn Road Industrial Estate
Kempston
Bedford MK42 7PN
☎ 0234 843388

CHECKOUT
PowerScan Colour V3.15

Ease of Use ●●●●○
The most difficult part to learn is the self-discipline to pull the scanner head over the image slowly and evenly.

Features ●●○○○
The image processing facilities are not good enough, and a number of features like cropping, rotating and slanting are cumbersome.

Speed ●●●○○
There's a lot of data to read in and convert to HAM, so it takes a while for an image to render on 68000-based Amigas. It runs at an acceptable speed on 68030-based machines.

Documentation ●●●○○
A slim manual, but it adequately describes how to set up and use the hardware and software. It could do with a large section or supplement manual that goes into detail about colour image processing.

Price Value ●●●○○
Equivalent systems for the PC cost about the same.

Overall rating ●●●○○

Both the interface and the software have a look and feel about them that suggest this product has been rushed onto the market. However, I'm sure it'll become more polished in time.

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Panasonic 1124	£8.50	£3.58	N/A
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Star LC-20	£4.47	£3.06	N/A
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COMPARE AND CONTRAST

System Requirements:	Morph* (v1.0.0)	CineMorph (v1.01)
DOS version	2.0 minimum	1.3 Minimum
Minimum memory	4Mb Fast, 1Mb Chip	2Mb Fast, 512K Chip
Accelerator	Recommended	Recommended

Both programs require adequate storage for the files produced. Floppy disks will do, but images can be more than 1Mb in uncompressed 24-bit form, so a hard drive is virtually essential for both.

Features:	Morph*	CineMorph
Single warping	Yes	Yes
Sequence warping	Yes	No
Dual image morphing	Yes	Yes
Sequence morphing	Yes	Yes
Auto tweening	Yes	Yes
Magnification	Yes	No
'Onion-skinning'	Yes	No
Scalable windows	No	Yes
ARexx support	Yes – extensive	No
On-line help	No	Yes
File types loaded	Colour and grey-scale directly, others after conversion with *Morph Plus*.	All IFF formats, including 24-bit and 8-bit, except HAM-8, plus JPEG/JFIF directly.
File types saved	All IFF formats, including HAM-8, plus ANIM OP5, JPEG and HAM-E, though most are only via *Morph Plus*.	All IFF formats except HAM8. ANIM OP5 supported directly, plus HAM-E and DCTV.
Output size	User definable	User definable

*** *Morph* is part of the larger *Morph Plus* suite, which has extensive image processing and compositing features and a wide range of load/save formats and many other important features.**

While it's probably true to say that morphing isn't ever going to be as popular as sliced bread, it's certainly been causing a stir among the public and media alike. Recent blockbuster movies such as *Terminator 2* have exposed the technique to huge audiences, and objects undergoing miraculous transformations are now all the rage in TV ads too. Morphing has thus become the latest 'must-have' in the film and video business, and software producers have taken the opportunity to cater for the many studios (and hobbyists) who want to use morphing effects, but haven't got Hollywood-sized budgets.

The two morphing programs under scrutiny this month – ASDG's *Morph* (which is part of the *Morph Plus* package) and GVP's *CineMorph* – are both recently-released products, but the honours for the first Amiga-based morphing software have already gone to Black Belt's *Imagemaster* (which I reviewed in *Amiga Shopper 18*). Both packages do morphing and warping on still images and sequences, but *Morph Plus* also does a lot more – as both its pricing and name reflect.

CINEMORPH

In many respects *CineMorph* is the simpler of these two packages, not least because it consists of just one program (in contrast to the modular approach of *Morph Plus*), dedicated solely to morphing operations.

In common with other morphing software, *CineMorph* uses vectors (points) to determine how images are warped (see the box on 'What is Morphing?' for a full description of the process). And, like the others, *CineMorph* has its own unique way of manipulating these vectors.

In this case, a mesh of points is pulled around to control the warping.

WHAT IS MORPHING?

Though morphing programs may appear to differ in the way that they work, the methodology behind each is actually very similar. So similar, in fact, that it seems suitable to explain it all in one place, rather than describe each program's techniques separately.

Put simply, morphing is a process for transmuting one image into another. This might be a black face changing to a white one (as in Michael Jackson's *Black Or White* video), or the T1000 in *Terminator 2* shifting to and from its human form. So long as the images can be imported into a computer system (by scanning, digitising from video, or whatever) they can be morphed. But video sequences cannot yet be morphed in real-time on the Amiga – the processing power required is far too great – so let's nip that spurious notion in the bud right away.

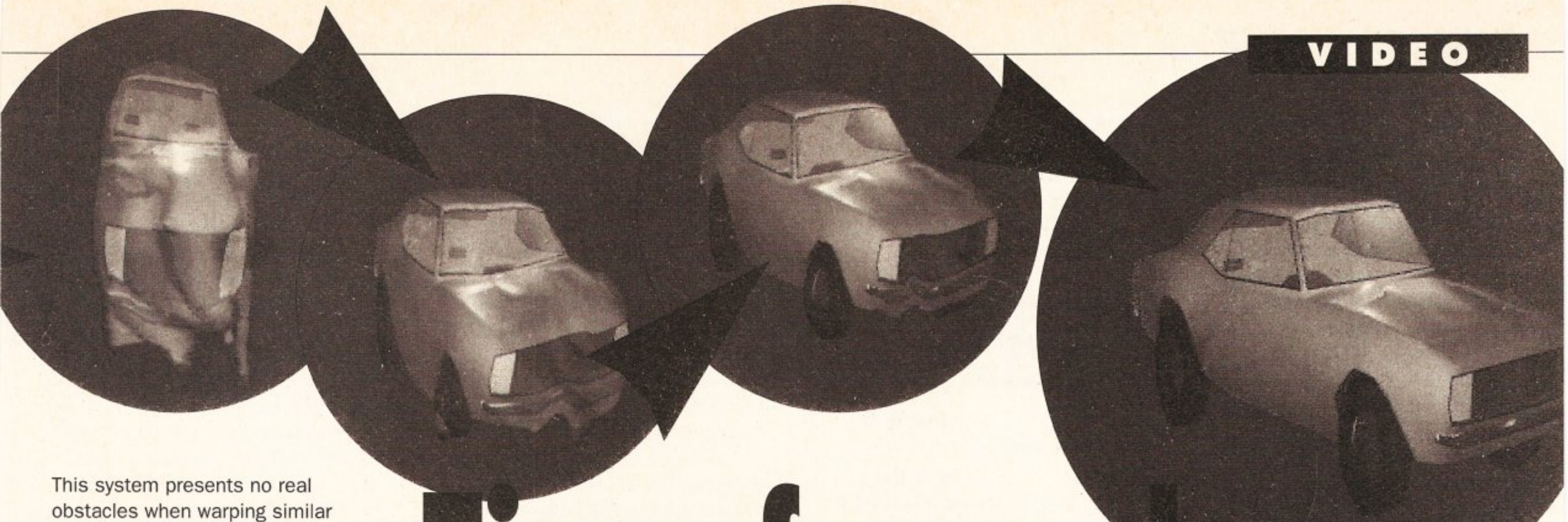
The morphing process involves a combination of shape-changing and cross-fading. Warping transforms the source image into the shape of the destination image and is controlled by using pairs of points (or vectors) which describe the start and end positions for specific locations on the images. Over a defined number of frames the vectors move towards their end positions, distorting one shape into another. For this reason warping is often likened to stretching a sheet of rubber with an image printed on it. Control can usually be applied to individual points or to all of them, so as to slow down or hasten their actions during morphing.

Cross-fading (or dissolving) between selected frames of the morphing series facilitates the smooth transition from one warped image to the next, a process which cannot be performed by warping alone. For extra control it is usually possible to specify just how much cross-fading takes place in each frame of the series.

This warp-dissolve process can also be applied to sequences of moving images, enabling one object to be turned into another while both are in motion. The example I have provided simply morphs a rotating cow into a rotating car. The original sequences were produced with *Imagine 2* and I made sure that both car and cow were in similar positions throughout each sequence so as to ease the morphing process.

"With some imagination, morphing can also be used to do special effects...."

It isn't necessary to manipulate the vectors for every single frame in a sequence, as a series of 'key' frames can be defined and the intermediate frames (the 'tweens') will be generated automatically,



Time for a change

'Morphing' one object into another is the latest craze in video special effects – and now you can do it at home. Gary Whiteley sees how two new transformation packages shape up

This system presents no real obstacles when warping similar images, such as faces, but can produce big problems when attempting a reasonably complex warp, such as the cow-to-car sequence I used as a test. Because *CineMorph* restricts how points move in relation to each other – with no mesh overlapping allowed – a lot of fiddling is required to set up the warping points correctly, something which is difficult enough when working on a dual-image morph, but a real headache when a sequence morph is desired. The problems are further compounded by the visually simple, but rather inflexible, split-screen display and *CineMorph's* unfortunate lack of both decent magnification and an 'onion-skin' facility.



You won't believe your eyes when you see some of the crazy things which morphing can do!

CineMorph uses two levels of complexity when defining warps – lines and splines. Lines warp faster but splines produce smoother results. Splines are also rather more difficult to manipulate, but not overly so. If more or less points are required in the mesh, extra columns and rows can be added or deleted at will and multiple points can easily be selected for bulk movement.

Unlike *Morph*, *CineMorph* can load images directly, having no need for a separate load/save program. It handled all the IFF formats I tried, including 24-bit, 8-bit and JPEG files, without complaint, except for the new HAM-8 mode, which wasn't supported in the version I had for review (version 1.01). As with other morphing products, the images are displayed as grey-scales to reduce memory overheads, and *CineMorph's* scalable image windows also help when memory is tight.

NOT ALL THERE

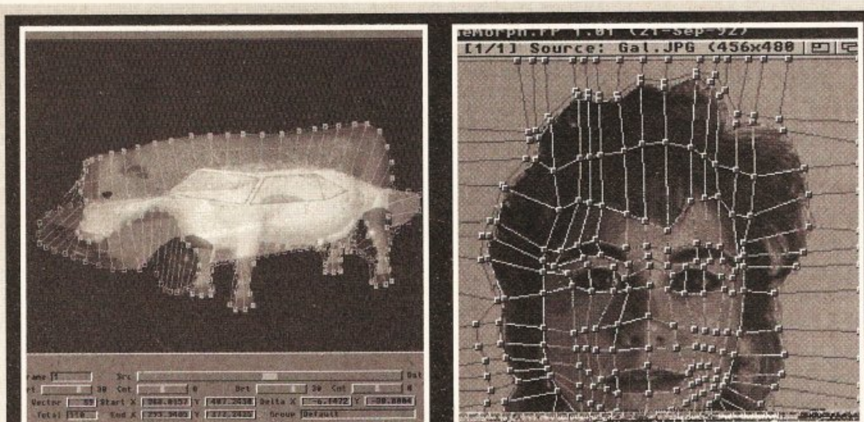
I found *CineMorph* to be much more awkward to use than *Morph* because the interface lacks the flexibility required for quickly comparing start and end points and accurately placing them on detailed images. The lack of any simple way of test-animating the points is also irritating, as the only way to test the warping structure is to render it as a mesh saving a large amount of time. The result – in my case – was a 10-frame animation of Bossy the cow morphing anti-clockwise into a Camaro car.

Morphing can be very flexible. Cross-fading is perhaps its simplest form, dissolving between two images while keeping all the vectors static, but with some imagination morphing can also be used to do special effects such as warping from one screen to another. Simple warps can be carried out with relatively few vectors, while complex warps may require hundreds – or sometimes thousands – to achieve the required degree of accuracy.

SLOW TIME

It should go some way to illustrating the learning curve involved in morphing when I tell you that it took me the best part of two days to achieve my little animation. Two days in which I was continually frustrated by the rubbish appearing on my Amiga screen. Two days of hard slog to produce a few images. I'm just glad that I've got a pretty quick Amiga with plenty of memory and storage space, because otherwise I'd probably still be experimenting while you wonder what happened to the *Video* column in this month's *Amiga Shopper*.

Serious morphing isn't for the faint-hearted or the shallow-pocketed. To achieve any kind of sensible throughput, especially at 24-bit quality, the host Amiga really has to be stacked with memory, storage, graphics hardware and a fast processor. Even then morphing only a few seconds of broadcast quality images could take several days to set up and produce. Lower quality and lower resolutions obviously render faster and save space, so if quality isn't of paramount concern it is possible increase output, but there is little benefit in skimping on either memory or speed.



As you can see, the user interfaces of *Morph Plus* (left) and *CineMorph* (right) are markedly different. *Morph Plus* adopts an all-in-one approach which is flexible enough to allow fast and accurate setting of the warping points, while *CineMorph* adopts a simpler, less memory-intensive, but somewhat less responsive format

In any case, by morphing on an Amiga the cost savings are substantial. The equivalent of last year's £30,000 hardware and software is now available for under £5000 – including a very high-specification Amiga – which serious video producers should recognise as a bargain, even if it is a little beyond the budgets of most home users.

overlaid on the output images. This works, but isn't ideal.

I was also very disappointed with the file requesters – trying to select a file before a listing was complete inevitably resulted in a terminal visit to the Guru, usually with disastrous consequences. This is blamed on faults in Commodore's DOS requesters and should be resolved in later versions of the *CineMorph* software.

But the worst problems occurred during sequence morphing. All seemed to be going smoothly until I began checking the auto-tweened frames between my designated key frames. Then the surprises started. The most regular problem was that the mesh had mysteriously elongated, so that much of it had disappeared from view and was no longer available for manipulation, as well as bearing little resemblance to either of its key frame parents. Try as I might, I found no adequate solution and, after just one too many crashes, I abandoned trying to sequence-morph with *CineMorph* altogether.

Obviously, this is a poor situation for such a program to be in and when I contacted the programmers in the USA they candidly (and bravely) admitted that they were aware of all the problems I described and had already fixed most of them, as well as working on new features for later release. However, enquiries with the UK distributor, Silica Systems, drew a blank as to when (and under what conditions) any upgrades would be forthcoming in the UK.

CHECKOUT CINEMORPH

Manual ●●●●○
Adequate but could be more lucid.

Features ●●●○○
OK, but I would have liked 'onion-skinning' and magnification included.

Quality ●●●●○
Dependent on chosen output, of course, but can be excellent in 24-bit.

Ease of use ●●●○○
CineMorph could be more user-friendly – although it is very easy to get started with.

Speed ●●●●●
Quick when rendering but setting up the morph can be excruciatingly slow.

Price ●●●○○
Fair, though I would be happier if it was more rounded and less buggy.

Overall rating ●●●●○

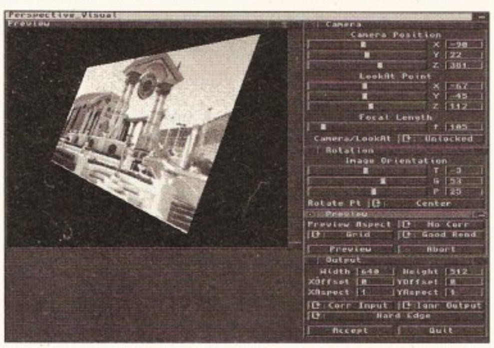
Though it has many excellent ideas and features, my impression was that it wasn't quite finished. For budget morphing this could be the program but not until the next version (at least) has been released.

MORPH PLUS

***Morph Plus* is an apt name for ASDG's offering, as morphing is just part of the far more comprehensive suite of programs provided.**

Morph Plus is very closely related to ASDG's *Art Department Professional*. So closely related, in fact, that owners of *ADPro v2.1* (or later) can add the new *Morph Plus* loaders, savers and operators to *ADPro* and use them from there, effectively discarding the *Morph Plus* user interface. What's more, *Morph Plus* also has two additional programs: *Morph*, which is the actual morphing program, and *FRED*, a tool for compositing sequences of images together – which is very useful if you can't write ARexx scripts.

First, an overview of how *Morph Plus* works. Generally speaking, an image is loaded into memory (using a Loader module) as a 24-bit file, regardless of its initial format. Then it can be manipulated, composited with other images, tweaked, altered, processed or otherwise doctored by using one or more of the *Morph Plus* Operator modules, then finally saved through the services of a *Morph Plus* Saver module. However, *Morph Plus* is far more flexible, though sometimes it can be a tough nut to crack.



Many of the *Morph Plus* operators have their own interfaces where images are manipulated. This is the one for the Perspective operator

For instance, with the new ANIM functions it is possible to compress a sequence of frames into an animation file or, conversely, extract frames from an existing animation. But before you can construct an animation it might be necessary to force all the frames into the same image format. Because *Morph Plus* has an ARexx interface it is possible to write a script which can automate the whole process, rather than having to tediously convert and compile each frame by hand. Since all aspects of *Morph Plus* can be addressed it is possible to do some very complex image manipulations and animate the results. But you shouldn't expect too much help from the manual beyond descriptions of the ARexx commands and a few cursory examples.

All this is in addition to scaling, dithering, colour balancing, cropping and a number of other indispensable tricks and treats, many of which have their own user interfaces. *Morph Plus* isn't as comprehensive in some areas as *ADPro,* though it complements it well without too much duplication. By the way, image quality produced from *Morph Plus* is on the whole excellent, especially if 24-bit is the name of your game.

THE GREAT MORPHO

Well, we've finally arrived at the reason we're here – the *Morph* program itself. It isn't completely independent, as it needs *Morph Plus* to be running to do the actual image manipulation, but otherwise it works as if it were a separate program.

The first time you use *Morph* you'll probably hate the default colour scheme which, coupled with the hi-res interlace, doesn't make for a comforting visual experience. But not to worry, the colours can be changed to suit your taste.

From then on it's simply a matter of choosing your operation – from moving morph, still morph, moving warp and still warp – and telling *Morph* what images it is to use, what size to output them at, how many frames are required, and which of the many options to use. These options are difficult to explain in such a short article but give *Morph* a lot of flexibility.

The fun part is the vectoring. 'Hot keys' make it quite easy to add vectors at the click of a mouse and then you just drag their start and end points around the images as required. It is also possible to add points which won't move, effectively 'pinning down' parts of the image and preventing unwanted distortion. And to make life even easier it isn't strictly necessary to use loads of vectors or points, as joining them together with the Edge command adds 'invisible' points between existing ones. These help to smooth out any potential problems.

If you are working on a morph involving two source images, *Morph* makes it quite simple to see both images simultaneously. Using the 'onion-skin' facility you can see a fully-adjustable mix of the two pictures, which makes vector placement very easy.

When the vectors and points are to your liking, it is possible to do a quick preview of just the vectors to ensure that all is well. The resulting wireframe animation can be played in a variety of speeds and directions to make accurate checking easier.

The next thing to do is to render the frames, which can be time- and memory-consuming depending upon the size chosen for the output. So take a break, have a cup of tea or forty winks and then return to check out your handiwork. All that remains to be done is to put the frames together and see how you did. But that's another story for another day...

SHOPPING LIST

Morph Plus £179.99
by ASDG
From: Micro-PACE UK Ltd, Unit 10, Perth Trading Estate, Perth Avenue, Slough, Berkshire SL1 4XX
☎ 0753 551888

Cinemorph £99.95
by GVP
Distributed by: Silica Systems, 1-4 The Mews, Hatherley Road, Sidcup, Kent DA14 4DX
☎ 081 309 1111

CHECKOUT MORPH PLUS

Manual ●●●●○
Well presented and full of information, but lacks clear instructions on ARexx usage, full details on the use of *FRED* and so on.

Features ●●●●●
Contains excellent and wide-ranging features.

Ease of use ●●●○○
Some aspects of Morph Plus are very easy to use whilst others are very difficult.

Quality ●●●●●
High quality output and effects throughout.

Speed ●●●●○
Not quite as nippy as CineMorph, but still very good, everything considered.

Price ●●●●○
Expensive if you already have ADPro 2.1, but compared with the cost of the Amiga-video system you need to get the best from this type of package, the price seems rather inconsequential.

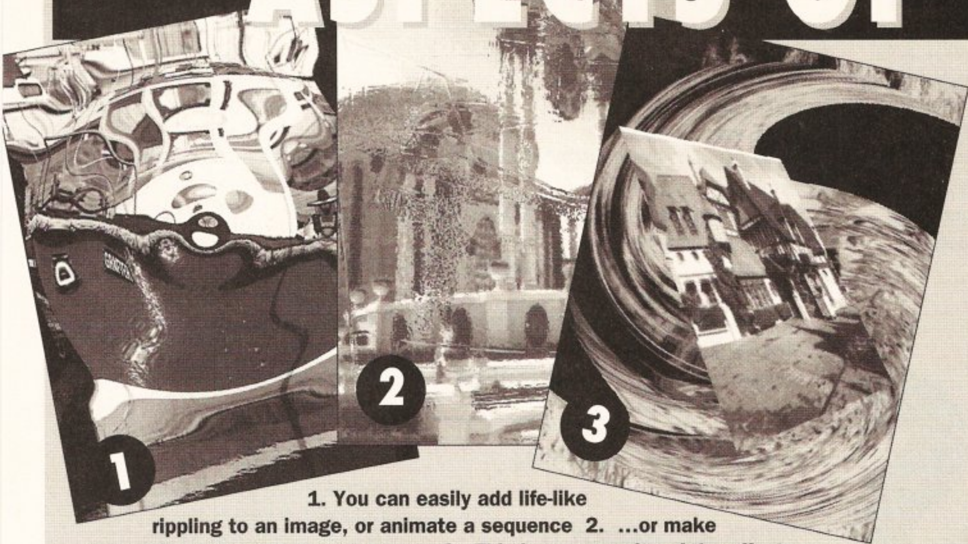
Overall rating ●●●●○

A flexible, and usable package with valuable functions in addition to its excellent morphing features, though marred by the manual.

All things considered, the only real choice of this pair has to be *Morph Plus*. *CineMorph* tries hard but hasn't quite made the grade – yet.

ASPECTS OF MORPH

Although we are mainly comparing morphing facilities this month, *Morph Plus* has many more strings to its picture-processing bow. The following images should give you a taster of some of its other attractions. Don't forget that all these effects can be controlled with ARexx and animated too!



1. You can easily add life-like rippling to an image, or animate a sequence 2. ...or make it look like it is actually underwater 3. This is a composite of the effects of Negative, Twirl and Perspective operations



Fish-eye and other spherical effects are simple with the Sphere operator

Window on the World

With PIP View you can watch TV on your Amiga screen. Gary Whiteley puts you in the picture

Here's a quick preview of a brand new piece of RocTec kit – the PIP View. For around £100, RocTec has just launched a sleek black box which operates as a remote-controlled TV tuner which can also do picture-in-picture tricks. Why? Well, obviously RocTec thinks it will sell to folks who don't have a TV with remote channel selection or who want to use one TV to watch two pictures at once.



PIP View can show two video signals on the same screen at the same time – all under remote control

INSIDE INFORMATION

For instance, say you have an Amiga with a 1084 monitor and you want to keep an eye on the big match while you blast some meanies – but the telly is downstairs and your other half is watching *Coronation Street* anyway. Enter PIP View. By plugging in an RF aerial feed and a composite output from your Amiga you can have the footie in a shrunken screen about one-ninth full size inserted over your normal Amiga screen.

Simply by hitting a button on the nifty infra-red remote control provided, the pictures can be reversed – if you wish to see that own goal in its full hair-wrenching glory. With three input sources to choose from you could also be monitoring Baby Jane while she dozes under the nursery surveillance camera – and still convince yourself that you love Big Brother.

A CLEAN IMAGE

The picture quality of the PIP View's tuner is extremely good – at least equal to what my domestic VCR can manage. Colour is good and the remote control and tuning operations are no more difficult to operate than a normal TV or video controller, though the layout of its buttons could be rearranged to make it less prone to accidental reprogramming. There is also a volume/muting control for the main sound and a mini-jack socket on the rear of the unit for monitoring the 'sub-picture' sound – the sound from the miniature image. The sub-picture itself can be placed in any of the four corners of the screen and, while small, it is certainly watchable.

LOGIC PROBLEMS

PIP View has a few quirks. There's no on/off switch – which means the unit is either on standby or just on – and a two-pin, American-style, mains plug on the transformer. And there's no pass-through for the aerial input, so the PIP View had better be the last item in your chain.

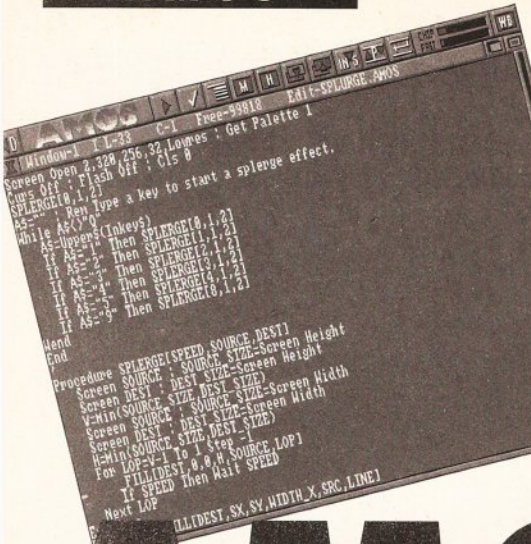
Then there are the Phono connectors – twelve of them in fact. Three for composite video inputs, six for audio inputs, and three more for video and audio outputs. The lack of RF output and, indeed, SCART sockets, means that the TV or monitor you are using with PIP View must have a composite input – either SCART or dedicated – a situation which is not all that common on many domestic TVs, especially older ones. So, I think RocTec's logic that people will buy PIP View as a means to upgrade their old manual TV sets to remote control doesn't hold water.

COMPOSE YOURSELF

However, if the PIP View could also work between the various TV channels as well as external inputs, if a Teletext decoder was included and if there was a full PIP View RF (aerial socket) output then I think Roctec would be on to a winner.

If you want to use an Amiga with PIP View then it will need a colour composite output. This is fine if you have an Amiga 600 or 1200, but other models will require an RGB to composite converter, such as a modulator or genlock. And don't forget that if you are used to crisp RGB output you'll be disappointed by the PIP View's composite-only output.

PIP View is an interesting approach to solving a specific problem, but I really wouldn't like to say how well it will sell in its present form. It is available from any of the usual RocTec dealers. AS



If you've just received *AMOS* for Christmas, or if you bought the Christmas issue of *Amiga Format*, then *AMOS Action* is for you. Every month it's packed full of news, tips and techniques about the Amiga's greatest ever programming language

AMOS >>ACTION>>

Jason Holborn continues his five-year mission to explore the wild world of AMOS. This month: a new book, hidden secret messages, and much, much more!

At the time of writing this column, the latest issue of *Amiga Format* has hit the streets – complete with *AMOS* on its front cover. As many of you also read this very good publication, I'm sure that many of you have also started reading *AMOS Action* for the first time. Together with those of you who were lucky enough to find an Amiga and *AMOS* lurking at the bottom of your Christmas stocking (all I found in mine was a pair of socks and some aftershave!), I'm very pleased to say that more and more Amiga users are now discovering the joys of *AMOS* programming.

It's also good to see that many of our regular readers have upgraded to *AMOS Professional*, the latest and greatest release of *AMOS*. If you haven't already moved up, then why not spend some of that Christmas cash that you received from your long-lost Auntie Gertie on the upgrade? As anyone who owns *AMOS Pro* will tell you, you certainly won't be wasting your money. *AMOS Pro* is a considerably friendlier and more powerful release of *AMOS* that truly pushes the Amiga to its limits. And when Europress finally gets around to releasing an AGA-compatible version of *AMOS* (to take advantage of the new A1200 chip set– see last month's issue for details), *AMOS* will finally establish itself as *the* programming language for the Amiga.

It's surprising that many Amiga programmers still look on *AMOS* with a certain amount of scorn. I guess it's probably got something to do with the fact that *AMOS* is based around BASIC, but this doesn't actually affect the power of *AMOS* . In the corporate computing market, BASIC is still regarded as a very good programming language, so the rather snobbish attitude that many programmers have towards *AMOS* is totally unfounded. I have to admit that I shared this opinion when Europress originally launched *AMOS* – having become more accustomed to the likes of C and assembler, the idea of going back to BASIC programming didn't really appeal to me at all. But, after little more than a few weeks playing with *AMOS*, I became a convert. Now that *AMOS Pro* has been released onto the market, *AMOS* is without doubt a truly professional programming environment.

> **"after little more than a few weeks playing with AMOS, I became a convert"**

READ ALL ABOUT IT

Those very nice people at Bruce Smith Books have finally turned their attention to *AMOS* with the launch of *Mastering Amiga AMOS*, the latest volume in their successful *Mastering Amiga* series of reference books. Written by my old friend Phil South, a fellow *AMOS* enthusiast, the book is designed with beginners in mind.

The book starts with a general overview of the history of the system and then moves on to *AMOS* itself, with a fairly comprehensive and very readable chapter on the *AMOS* editor. It explains how the editor works in quite some detail, with individual sections on most of the more powerful functions. It then expands the subject matter still further with a look at the extensions that can be added to *AMOS*, including the usual *AMOS Compiler* and 3D extensions.

Quite a sizable chunk of the book is dedicated to *AMOS* Basic, where the principles behind good programming are explained. All this is pretty generic stuff though, so even the greenest *AMOS* programmers will probably find the subject matter somewhat obvious. Phil then moves onto the rather dull subject of the *AMOS* Math functions, which rapidly sent me off to sleep.

With all this theory behind us, the book then moves on to *AMOS'* own particular talents, with a look at

AMOS ANSWERS

If AMOS is giving you grief, then Jason Holborn is the man to put you out of your misery

PARALLEL PROCESSING

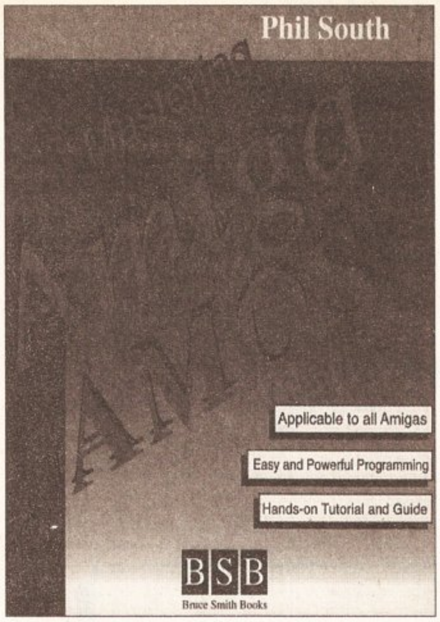
Is there a way of reading the parallel port from within *AMOS*? I want to be able to use a four-way adaptor, allowing up to four players to play against each other within a game that I'm writing.

Ian Norris
Newcastle

I have to admit that I've never tried to address a four-play adaptor from within *AMOS*, so I don't know how the Amiga communicates with this particular device. I guess the best way to find this out is to write a little program that monitors any information received through the parallel port. *AMOS* does provide the commands you need in the shape of the 'Parallel Open', 'Parallel Send' and 'Parallel Input$' commands.

COMPILER QUERY

I have recently upgraded from *AMOS* 1.34 to *AMOS Professional* directly



***Mastering Amiga AMOS* from Bruce Smith Books – could this be the guide that *AMOS* programmers have been waiting for?**

screens, sprites, bobs and AMAL. Although all three of these sections start well, I have to admit that I think that the book is rather brief in its descriptions. The chapter on screens, for example, describes the task of opening screens, but doesn't even show you how to open HAM screens, while the options that are discussed aren't covered in enough detail. Considering that the book is aimed at complete beginners, this sort of lack of detail is inexcusable.

Far more space should have been dedicated to the basics of *AMOS* programming, rather than covering extensions such as *CText, AMOS Tome* and the *SpriteX* editor.

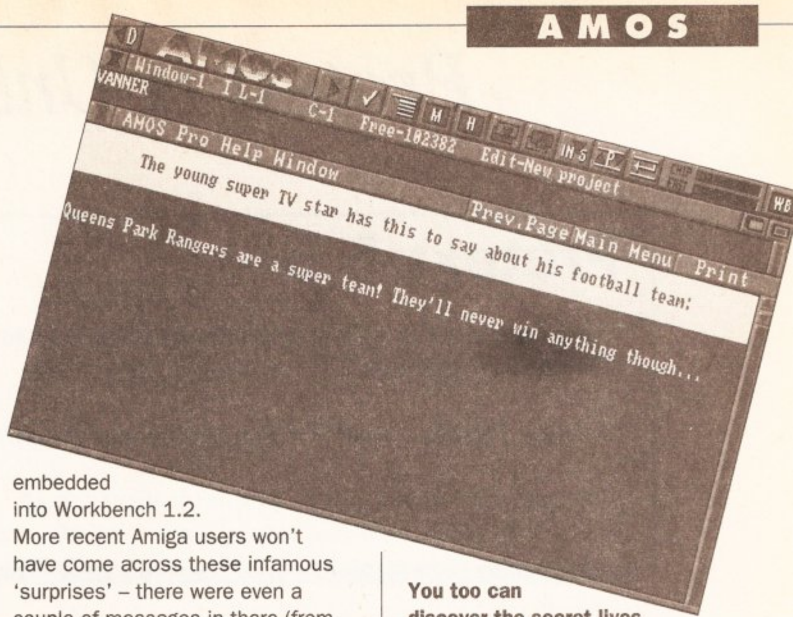
I'd love to give Phil's book a rave review, simply because I consider him a friend and fellow journalist, but I'm afraid that my conscience could never take the strain. Past Amiga releases from both Phil and Bruce Smith Books have been very good indeed, but *Mastering Amiga AMOS* is just too sketchy to be of any great use. It's a great shame – I still feel that the ultimate *AMOS* book still hasn't been written. When it does arrive, I'm sure that it will literally clean up.

PUDSIE'S HELP SCANDAL

It's amazing what sort of things you can find when flicking through a program's system files. As well as a few interesting routines, you can also find more frivolous items, such as secret messages embedded by the programmers as an 'in-joke'. Probably the best-known examples of this are the secret messages that were embedded into Workbench 1.2. More recent Amiga users won't have come across these infamous 'surprises' – there were even a couple of messages in there (from the developers of the Amiga's systems software) that didn't exactly compliment Commodore on its handling of the early Amigas.

"recent Amiga users won't have come across these infamous surprises"

Secret messages are still popular amongst programmers and the creators of *AMOS Pro* are certainly no exception. Only the other day I was poking my nose into areas of *AMOS Pro* that Europress would probably prefer us users to stay well clear of, only to find secret messages embedded in *AMOS Pro*. Although none of them could be called scandalous, they do give you an insight into the sort of people that brought us the world's greatest programming language.



You too can discover the secret lives of Richard Vanner and the rest of the Europress team. It's all to be found in *AMOS Pro's* Help menus

The messages in question are embedded into *AMOS Pro's* On-line Help system. To access them, load up *AMOS Pro* and enter one of the following names into the *AMOS Pro* editor, enclosing each one within speech marks. Then move the cursor over the first character of each name and press the **[Help]** key to see the text. Try these for size: VANNER, LIONET, PUDSIE, DAISY, CARRINE, MEL, STEPHEN and DITHEL.

from Europress Software. I most sincerely think that it is worth the praise that you heap upon it. However, I am interested in knowing the following things:

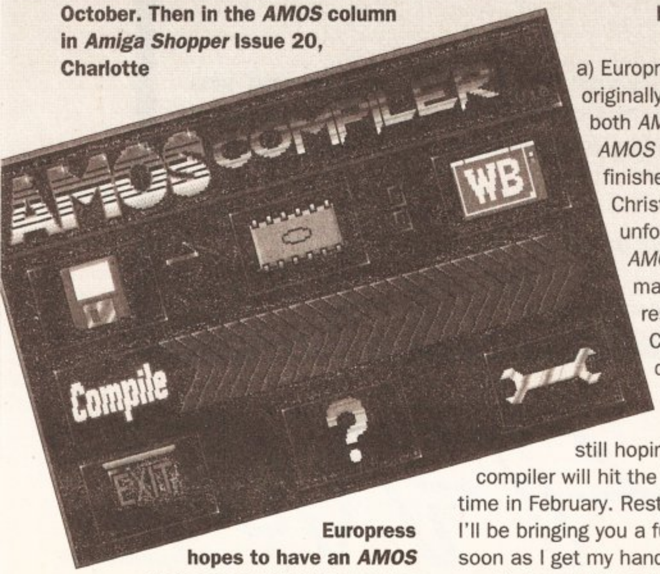
a) In the help menu there is a 'Latest News' section that mentions the *AMOS Pro* compiler. According to this help menu, the compiler should be available by the end of October. Then in the *AMOS* column in *Amiga Shopper* issue 20, Charlotte Hemmings said "Europress have assured me that a compiler for *AMOS* Pro will be released during February of next year". Which is more accurate?

b) I also have the *AMOS Tome* extension (the compiler version). Will this extension ever be upgraded for *AMOS Pro?*

Jason Redway
Basildon, Essex

a) Europress had originally hoped to have both *AMOS Pro* and the *AMOS Pro Compiler* finished in time for Christmas, but unfortunately only *AMOS Pro* actually made it. In this respect, Charlotte's comments are indeed true. Europress is still hoping that the compiler will hit the streets some time in February. Rest assured that I'll be bringing you a full review as soon as I get my hands on it.

b) Aaron Fothergill (the author of *Tome*) has recently released *Tome* version 4, which I am assured is fully compatible with *AMOS Professional*. Contact the *AMOS* Club to obtain your upgrade.



Europress hopes to have an *AMOS Professional Compiler* on the market some time in February

WHERE'S RAMOS?

I've recently upgraded to *AMOS Professional* which, on the whole, I'm very, very pleased with. However, try as I might, I cannot find an *AMOS Pro* version of the *AMOS* RAMOS Runtime system. Considering that Europress still haven't launched an *AMOS Pro* compiler, how can I distribute my *AMOS Pro* programs without infringing Europress copyright?

J Jones
Dundee

You're right, *AMOS Pro* doesn't have its own version of RAMOS. Instead, Europress opted for a far more elegant solution to the task of running programs independently of the main interpreter.

AMOS Pro is structured so that the editor actually consists of three entirely separate elements – the editor program, the interpreter and the monitor. When you load the interpreter, it automatically loads up both the editor and the monitor. However, it is possible to run *AMOS Pro* programs independently of the main *AMOS* package simply by copying the entire *AMOS Pro* System disk and then deleting the following files from the APSystem drawer:

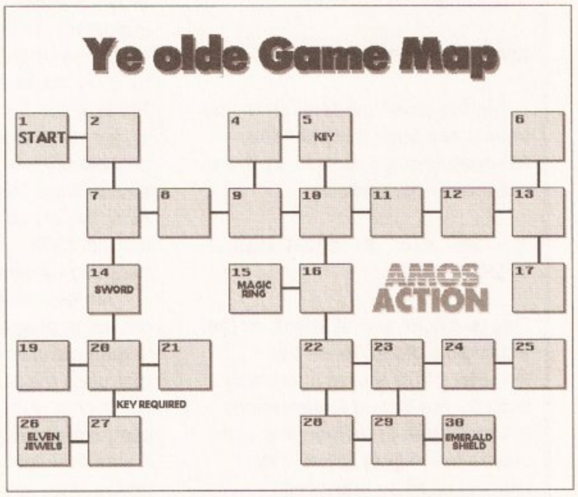
```
AMOSPro.Editor
AMOSPro.Editor_Config
AMOSPro.Monitor
AMOSPro.Monitor_Config
```

You can then install your program on the stripped *AMOS Pro* system disk and run it by typing **AMOSPro <Filename.AMOS>** from the CLI. As the editor and monitor program files don't exist, the interpreter will simply load and run your program. If your CLI knowledge isn't too hot, simply copy your program onto the disk under the name 'Autoexec.AMOS' and *AMOS Pro* will automatically load and run it.

If you plan to distribute your programs, do always ensure that the four files listed above are deleted before you hand out copies of your *AMOS Pro* program. If you distribute a disk that has these files intact, you will essentially be handing out pirated versions of *AMOS Pro*. And if you do this, expect a visit from the local constabulary.

GAMES PROGRAMMING

ADVENTURE GAMES – PART 2



Movement around our adventure map (shown above) is controlled via a two-dimensional array

Last month we took a brief look at how movement is controlled around the various locations within an adventure game. Obviously this is the most important aspect of the game. After all, it would hardly be much of an 'adventure' if the player's alter ego were to stand in the same place. Even on an unexpanded 512K Amiga 500, it's possible to create some really quite substantial game maps that the player can wander around and explore.

But before you sit down and start coding your latest Infocom-killer, it's well worth taking time out to design the game map. This is very important indeed, as you need some form of reference material to feed in all the information that the movement routine will use. The size of the game map is entirely up to you, but bear in mind that each and every location needs its own textual description which must be fed in by hand, along with all the various movement attributes that will be needed.

So, what do you need to get started? First of all you'll need to draw up a map, similar to the one shown on this page. Every single square within the map is a location that the player can move to via one or more of six different directions – north, south, east, west, up and down. To make things somewhat more complicated, you can also control the movement by making certain paths (a path is the imaginary line that joins two locations) either one way or 'restricted entry', in which case the player must have a certain key or object to travel along that particular path. The paths themselves will be completely transparent to the player – they're simply there to serve as a reference when keying in all the location data.

DIMMING SWITCH

Now that we have our path, we need to key all the map data into the computer. You'll need to create a dimensional array that holds all the map's path data using a command such as DIM Paths(100,6). This will create a 100 by 6 two-dimensional array. The first part of the array definition dictates how many locations are in the game – in this case, we've opted for 100. The second part of the array definition holds the six movement attributes that will be assigned to each location – one for north, one for south, one for east, and so on.

Each of these movement attributes acts as a sort of pointer, telling the adventure game parser which location the player would move to if they opted to move in a particular direction. Say, for example, the player was currently at location 10 and a movement to the north would take them to location 12. The movement attribute that holds the north direction for location 10 would therefore hold a value of 12. Similarly, the opposite would also be true – the attribute that holds the

AMOS FOR BEGINNERS

COMPRESSING your SCREENS

When you're writing programs in *AMOS*, it's often handy to be able to store all the graphics that the program needs as part of the program itself. This removes the need to load in graphics from disk each and every time the program is run. Say, for example, you were writing a game in *AMOS*. If you were to load in the game's title screen every time the player finished a game, this would not only be rather tiresome, but it would also allow others to gain access to your graphics. If you've been slaving over *DPaint* for hours to produce a beautiful title screen, you might not want this at all.

However, there's only one small problem – graphics require large amounts of memory. Even a low resolution screen with just 16 colours will eat up over 20K. So, maybe a single picture is hardly going to cause problems, but imagine what would happen if you only had a 512K machine and you tried to store 20 different pictures – this would use over 400K! Once again, though, *AMOS* has the answer with its very clever built-in screen compaction routines that can crunch any screen down to a fraction of its original size. The crunched images are then placed into a permanent memory bank. You can then display them on your Amiga's monitor using the *AMOS* decompaction routines.

CODE CORNER

So how do you go about pulling graphics into your program in the first place? Well, this is very easy indeed. The first thing that you need to do is to open a screen that can be used to display the image, like this:

```
Screen Open ↵
0,320,256,32,Lowres
Flash Off
```

The **Screen Open** command above opens up a low resolution screen with 32 colours. At this point, nothing will be displayed, simply because all that *AMOS* has done is to create a screen for you to work with. Note the **Flash Off** command too – this is used to turn off *AMOS'* automatic colour cycling facility. If we were to leave colour cycling on, we'd get a rather strange effect when the image was loaded in. Next, we load in the image that we want to display using the **Load IFF** command:

```
Load IFF "PICS:MyPicture"
```

This very powerful command is used to load in and display the image **MyPicture** stored on a disk (or logical device) called **PICS:**. Obviously the filename used will have to be changed when you use this command so that it correctly finds and loads a picture file that you have on disk. I use the logical assignment **PICS:** simply because that's where I store pictures on my hard disk. If you wanted to load a picture called 'Harold' that was stored on a disk in the internal drive, you would therefore change this to Load IFF "DF0:Harold".

LEADER OF THE PACK

Now that we have the picture loaded in, we need to pack it and store it in a permanent memory bank. Under *AMOS 1.34*, 16 of these banks can be used, but there's no limit under *AMOS Professional* (well, you are limited to 65,536 different banks, but I doubt that you'll ever use them all!). What we need to do next is tell *AMOS* that the image displayed in a specified screen is to be packed and stored into a memory bank. Because the image has been loaded into screen 0, we therefore add the following line:

```
Spack 0 to 1
```

When we run the program, a screen will appear and, after a

south direction for location 12 would contain a value of 10. It's important to remember which movement attribute holds the information for a particular direction – reading the value for the north attribute when the player actually wants to move south could be disastrous!

If you're not too sure about two-dimensional arrays, then it may be worth splitting the array up into six individual arrays named 'North', 'South, 'East' , and so on. However, this will make the movement code somewhat more complicated, simply because you'll have to write six separate routines to handle movement in the six different directions. By using a single array that holds all the movement data, a single routine can be used instead.

Anyway, let's take a look at the movement routine. It's a little primitive, but it does the job. The routine itself is called after the command that the user enters has been parsed. (This is done using the **SCANF[]** routine published last month.) You must then interpret the string array returned by that routine and – if the player wants to move – the direction of movement (north, n, south, or whatever) is passed to the **_MOVE** procedure. The procedure starts by converting the string into the appropriate path attribute – 0 for north, 1 for south, and so forth. If the direction of movement is not understood (for instance, if the player entered something like 'GO WABBLE'), then the error message 'Go where?' is displayed. Once this has been done, the routine then checks the **PATHS** array to see if movement in the direction that the player has requested is allowed. If it is, then the **LOCATION** variable (which holds the player's current position within the game map) is updated by copying the pointer held in the **PATHS** array into the **LOCATION** variable.

A general purpose routine called **DISPLAYTEXT** is then passed the value held within the **LOCATION** variable. This routine simply displays the location text that is associated with the new location. How you do this is entirely up to you. I personally prefer to hold the location text on disk as a random access file which is accessed using the **LOCATION** variable as an index pointer. But you could simply build up a huge string array that holds all the map text as a series of strings. AS

HELP! I NEED A HOLBORN!

Every month our resident *AMOS* genius *(who, me? – Jason)* answers your *AMOS*-related problematic prose within these very pages. If there's an aspect of *AMOS* that is troubling you, then send your letters to Jason Holborn, *Amiga Shopper*, 30 Monmouth Street, Bath, Avon BA1 2BW.

LISTING • LISTING • LISTING • LISTING

```
' *** _MOVE - General Purpose Movement Routine
' ***
' *** Variables: DRCTION = Holds direction as a value
' *** DRCT$ = Direction as a string
' *** DR$ = Direction as a string
' *** LOCATION = Current Location number
' *** PATHS() = Path data

Procedure _MOVE[DRCT$]
DRCTION=-1
For C=0 To 5
Read DR$
If DR$=Upper$(Left$(DRCT$,1))
DRCTION=C
End If
Next C
If DRCTION<>-1
If PATHS(LOCATION,DRCTION)<>-1
LOCATION=PATHS(LOCATION,DRCTION)
_DISPLAYTEXT[LOCATION]
Else
Print "Sorry. You cannot move in that direction"
End If
Else
Print "Move where?"
End If
Data "N","S","E","W","U","D"
End Proc
```

second or so, the program will have finished, *AMOS* will drop out to direct mode, and we'll be left with our image displayed on the screen. However, a lot more has happened here than you may actually realise. Instead of simply displaying a picture on the screen, *AMOS* has taken the image that is currently being displayed on screen 0, packed it down to a more manageable size and then stored it in memory bank 1. We now have the image stored in a memory bank. If you don't believe me, go into direct mode and enter the following command (ignore the 'AMOS>' bit, it's just there to show that we're in direct mode):

```
AMOS> List Bank
```

In the direct mode window, you should see something like the following (though don't worry if it's not exactly the same):

```
1 - Pac.Pic. S: $003FBAA8 L:
37192
```

This is *AMOS*' way of telling us that a packed picture (hence the **Pac.Pic.** bit) is stored in memory bank 1. The **S:** and **L:** extensions tell you where in memory the bank can be found (just ignore this unless you're an advanced programmer!) and the total size of the bank in bytes, respectively. However, it's worth noting that the **L:** value doesn't always denote the bank's length – if you have loaded in any sprites or icons, the **L:** value will tell you how many sprites or icons are in the bank. OK, it's rather confusing, but just bear this in mind and you won't go far wrong.

BRINGING IT BACK

Right, so we now have our image safely stored in memory. Now we just need to extract it when the program is run. This is very simple indeed. All you need to do is to open up the screen using **Screen Open** and then just issue the following command:

```
Unpack 1 to 0
```

The **Unpack** command needs two arguments – the number of the memory bank that holds the packed image data and the number of the screen that the image data is to be displayed in. In the case of the example above, image data stored in memory bank 1 is to be extracted, decompacted and then displayed in screen 0. Note that screen 0 must have been opened first. However, it's not necessary to set up the palette fot the image before extracting it using **Unpack** – *AMOS* automatically stores all the palette, image and even screen position and size information as part of the bank. You don't even need to issue the **Flash Off** command if the original image had this turned off when it was packed the first time.

Because the image data is not being loaded from disk, we obviously no longer need to use the **Load IFF** command. Even when you save your program off to disk and then load it up a few days later, the image bank will still be there simply because *AMOS* saves all its permanent banks as part of the program code. You'll notice a large increase in the size of your programs when you start using memory banks for this very reason. For example, I'm currently working on a project that uses a lot of packed screens. Although the source code itself is no larger than 30K, the actual program file is around 200K – that extra 170K is taken up by packed images!

Anyway, here's two versions of the same program – one that uses screen compaction and another that uses the standard **Load IFF** command. Note that the screen compaction program won't work as it stands unless you first load in an image and pack it into memory using **Spack**. You can use these programs as templates showing how to load in images stored in memory banks:

```
Rem *** Example 1 ***
'
Screen Open ↵
0,320,256,32,Lowres
Flash Off
Load IFF "PICS:MyPicture"


Rem *** Example 2 ***
'
Screen Open ↵
0,320,256,32,Lowres
Unpack 1 to 0
```

COMING NEXT MONTH

Would-be games programmers should definitely tune into the next issue of *AMOS Action*.Over the past few weeks, I've been playing around with dual playfield displays and next issue I'll be showing you how you can use this powerful facility to add parallax scrolling effects to your games. It's all in next month's *Amiga Shopper* – can you wait that long?

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Your guarantee of value

It's not only the best TV soaps and lagers that come from down under – there's a thriving Amiga music scene there too. In fact, this month's *Music* pages have a distinctly Australian flavour because, courtesy of BlitSoft Products, I've been able to get my hands on the first batch of Black Knight Peripherals music products to arrive in the UK.

There are two items are on this month's agenda: a sound sampler and a more specialised SMPTE synchronisation box.

THE CRYSTAL SOUND SAMPLER

8-bit Amiga sound sampling has attracted a great deal of interest, especially since it's an area which anyone can get into. You can get hold of perfectly adequate sampling hardware from £20 upwards, while for around £40 a complete 'hardware plus sample-editing software' package can be obtained.

However, the units available at the low end of the market tend to cut costs by not having things like gain controls and printer pass-through facilities. This can make a big difference – although it has been proved time and time again that it is possible to get good results with many of the cheaper sampling units around, you do need to provide decent quality input signals at the proper sound level. You'll find that those who do get excellent results with budget samplers tend (at the very least) to have access to a reasonable quality audio mixer for level control.



The *Crystal Sound* sampler – poised to attack the top end of the 8-bit sampler marketplace!

Of course, many Amiga users haven't got banks of audio equipment lying around, and in these cases it's worth spending a bit more on a sampler that allows you to adjust the level of the input signal. On top of this, it's also convenient to have a printer pass-through socket. This means that you can keep the sampler connected to the Amiga's parallel port all the time and switch between using the sampler and printer without having to keep unplugging and swapping leads.

These extra goodies, coupled with more sophisticated sample-editing software, are the types of features provided by more up-market sampling packages. The acknowledged 'top of the range' 8-bit sampling unit is of course the package now known as *Audio Engineer Plus,* which has stood virtually unchallenged since the day it arrived on the Amiga scene.

Nowadays we regularly see additional budget sampler units appearing on the scene, but recently a product has arrived which has set its sights on the very top end of the sound sampling marketplace. This product is Black Knight Peripherals' *Crystal Sound* sampler, and (as you probably gathered from last month's issue) I've spent the last few weeks putting it through its paces.

THE HARDWARE

The thing that immediately strikes you about the *Crystal Sound* sampler is that the construction quality is extremely good. The back panel contains two standard DB25 connectors: one of these is used to link the *Crystal Sound* hardware to the Amiga's parallel port, while the other is a pass-through port which can be used to connect your printer. A standard DB25 male/female cable is needed to make the Amiga-to-*Crystal Sound* connection, but the bad news here is that a suitable connecting lead is not supplied with the package. So, the first thing most users will have to do is go out and buy one.

Internally *Crystal Sound* uses twin, ultra-fast low-noise A/D (analogue to digital) converters which can sample at over 70KHz in stereo on an A3000, and at just under 40KHz in stereo on an unaccelerated A500 (which rises to about 44KHz when mono sampling). The 'techies' among you might also like to know that conversions are 'crystal locked' and that there are 'double pole active audio filters' on all inputs!

The main *Crystal Sound* controls appear on the front panel. There are two rotary gain controls (for left and right channels), two RCA phono socket line-level inputs (270mv sensitivity peak-to-peak), and two 6.5mm standard jack microphone-level inputs (microphone gain 40dB). On the far right of the front panel lies a toggle switch which allows you to bypass the sampling circuitry and use a printer without having to unplug anything.

THE SOFTWARE

Crystal Sound's main claim to fame is its hardware – unlike most such units, it does not come with a sample editing program. However, a 'Sampler Tool' is provided for collecting samples. The Sampler Tool display is rather basic but nevertheless it does provide all the usual rate, sample size, trigger level, monitor, save and play facilities you might need. It actually performs extremely well and will happily co-exist with all of the popular sample editing packages that are available. The *Crystal Sound* hardware has been designed to be compatible with any software that can use *Perfect Sound* modes 1 and 2 – for instance, the software provided with *Audio Engineer* works extremely well with *Crystal Sound.* More to the point, there are a number of other sample-editor programs that will be particularly suitable because they can be purchased individually (in other words, without hardware), *AudioMaster IV* being perhaps the most obvious example.

The *Crystal Sound* disk also provides some other 'support' software as well. Firstly, here are some details of the programs:

Wizar

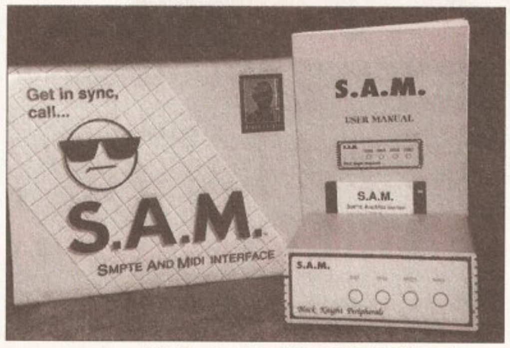
TimeCode: controls Black Knight's SAM, SMPTE, and MIDI interface, allowing you to 'stripe' audio and video tape with time codes.

RexxTime: lets you synchronise AREXX scripts to MIDI time code. Potentially this has all sorts of uses, including exciting multi-media stuff involving more than one computer,



PLAY IT AGAIN, SAM

***SAM* is another product from the Black Knight Peripherals company that has recently hit our shores. It's slightly larger than the *Crystal Sound* unit (measuring 14cm by 15cm by 6cm), but the construction quality and general appearance is similar – save for the fact that the front panel is flat because touch controls are used. It combines a five-port MIDI interface (one MIDI IN and four MIDI OUTs) with a time code converter unit which can generate and convert time code signals. The back panel contains two DB25 connectors (one for the Amiga and one for printer pass-through), the five MIDI connectors and, of course, the two 6.5mm jack SMPTE in/out terminals.**



SAM – the combined SMPTE and MIDI interface from Black Knight

The unit is typical of the sync units that you'll find discussed over the page in this month's introduction to SMPTE and MTC. Basically *SAM* will convert SMPTE time code audio signals to MIDI time code and then merge those messages with

ds from OZ

A high quality sampler and a MIDI synchronisation unit are two new products from Australian company Black Knight Peripherals. Paul Overaa puts them to the test

but it does of course require a MIDI time code source.

AnimBeat: plays IFF animations in time with MIDI time code – in other words, this will synchronise animations to music on tape.

BurnOSDMO, **EpromDMO**, and **HWConfig:** the first two of these programs control Black Knight EPROM burners and the third the company's 'No More Switches Card', which in turn controls the KickMagic and TopChip 2Mb Chip RAM boards.

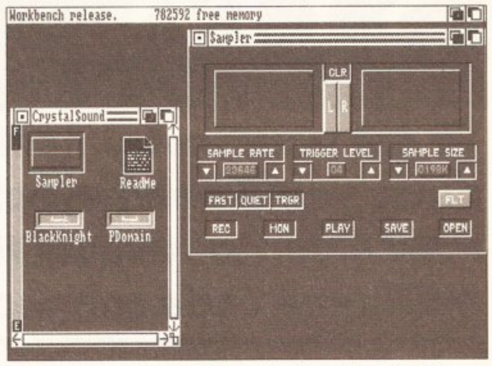
This is all very interesting but you may have noticed one minor snag: none of these programs have anything to do with sampling at all. In fact they are actually for use with SAM – the other Black Knight product I'm looking at this month.

However, in addition to the above offerings, you do get a number of public domain programs. These include: a voice-controlled CLI/Shell interface (which is really only of experimental interest), a frequency-to-colour spectrogram plotter, a Mac-file to raw converter, and a couple of direct record-to-disk and play-from-disk programs. I've got to be honest here – taken together, the programs on the disk come across more as a 'public domain hotchpotch' rather than a commercial offering. This is made all the more noticeable by the absence of a decent sample editor.

THE BOTTOM LINE

The *Crystal Sound* unit costs £94.95 and the hardware is absolutely brilliant. The package is let down badly by the software on offer, but given a decent editor, *Crystal Sound* is head and shoulders above all other Amiga samplers on the market bar one – *Audio Engineer Plus*. Both hardware units have specs that far exceed the Amiga's own sampling capabilities. In fact using them with an Amiga it has proved virtually impossible to tell the units apart.

If you already own editing software that you are happy with and are just looking to upgrade your sampling hardware, then *Crystal Sound* looks to be an extremely attractive offering. If, however, you are looking towards building a complete sampling package based on *Crystal Sound* from scratch, then the scenario is rather different. From a practical viewpoint let's assume you spend £94.95 on a *Crystal Sound* unit. To that you'll need to add another £10 for a lead, and say £70 for *AudioMaster IV* (there's no point in having good hardware if you don't go for a good editor as well). That total, if I've done my sums correctly, is five pence short of one hundred and seventy five quid! That's certainly not cheap and, although the complete *Audio Engineer Plus* package is even more expensive (it



***Crystal Sound's* Sampling Tool is primitive, but has most of the basic operations you might require**

currently costs just over £200), I suspect that, given *Audio Engineer's* established reputation and software support record, that it still has the edge over this latest competition – but only just. Especially considering the current economic climate, if the Black Knight *Crystal Sound* package could be offered at a slightly lower price it would almost certainly tip the scales in favour of this new offering!

whatever else is passing through the unit's MIDI IN terminal. It can read and write SMPTE code in both forward and reverse directions, and, providing you are using it with suitable software, will enable you to lock your Amiga and any MIDI gear to a multi-track tape or video unit.

SERIAL KILLER

SAM needs access to the Amiga's serial port and so it is quite possible that compatibility problems may occur with some types of MIDI sequencing software, depending on the particular sequencer you are using. If, for instance, your sequencer takes over the Amiga's serial port for exclusive use, then the *SAM* software is not going to be able to function. *Bars & Pipes* users have apparently had difficulties with *SAM*, and Black Knight now provides an updated MTC tool which has solved these initial problems.

Software-wise *SAM* fares much better than the *Crystal Sound* sampler. In fact most of the items supplied with *Crystal Sound* are actually *SAM*-orientated, and were clearly designed to work with the SMPTE/MTC sync box! Among the software provided there is the TimeCode tool which allows *SAM* to be remotely controlled from the Amiga (making it possible to switch modes, change time code formats, do time reversals, and activate the MIDI/echo option). It is also possible to remotely switch the sync mode so that the Amiga's video frame rate is used instead of *SAM*'s own internal crystal-locked time (which is actually much more stable than the Amiga's video timebase). Other utilities include RexxTime which allows SMPTE-style (hour, minute, second and frame) time messages to be sent to other programs.

TIMING IS MONEY

SAM costs £149.95 and, relative to other units, this is quite a competitive price. For instance, the excellent Dr T's *Phantom* SMPTE interface, which is supported by heavyweight sequencers like Blue Ribbon Soundwork's *Bars & Pipes Professional* and Dr T's own *KCS*, costs £249 (the *Phantom* unit actually provides direct sequencer-SMPTE links).

As with the *Crystal Sound* sampler, *SAM* is an extremely well-made unit and it could certainly win friends among the Amiga musicians who need this type of SMPTE/MTC time syncing facilities.

CHECKOUT SAM

Ease of Use ●●●○○
Simple enough to use if you are into SMPTE/MTC applications. But you will need to check that your sequencing software supports MIDI time code!

Features ●●●●○
This is another Black Knight unit which, hardware-wise, scores very highly indeed. But, on this occasion, a lot of useful software is provided.

Documentation ●●●●○
Again the manual is relatively slim but it is still quite adequate!

Price Value ●●●●○
Incidentally, you do have to supply your own lead to connect the SAM unit to the Amiga's serial port.

Overall rating ●●●●○

Another well-constructed piece of Black Knight kit!

CHECKOUT CRYSTAL SOUND

Ease of Use ●●●●●
Learning how to use Crystal Sound couldn't be easier.

Features ●●●○○
Hardware-wise Crystal Sound scores very highly indeed. But as a complete package the lack of a sample editor is a major concern – it's a pity that Crystal Sound isn't bundled with an editor like AudioMaster IV.

Documentation ●●●●○
Slim but perfectly adequate!

Price Value ●●●○○
You have to supply your own lead to connect the Crystal Sound hardware to the Amiga's parallel port and you'll need a decent sample editor.

Overall rating ●●●●○

Not cheap, but there's no doubt at all that this well-constructed and reliable piece of sampling kit could well end up giving Audio Engineer a good run for its money!

SHOPPING LIST

Crystal Sound Sampler........ £94.95
SAM................................ £149.95
Available from:
BlitSoft
☎ 0908 666265

THAT SYNC'ING FEELING

To get your instruments playing in time, you'll need synchronisation. Paul Overaa reveals the SMPTE-MIDI time code connection

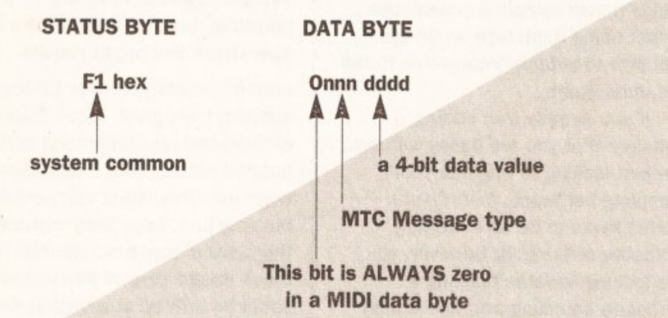


Figure 1: Internal layout of a quarter frame MIDI time code message

SMPTE is the Sound Motion Picture and Television Engineers standard for an audio signal used to encode timing information. Time stamps are represented in terms of a time of day (hours, minutes, seconds and 'frames') which can be recorded onto an audio or video tape and then used to synchronise other devices, or, in other words, to 'lock' them to that same time frame. SMPTE can keep other units in sync with tape devices even if there are minor fluctuations in tape speed, and, since it can be read both forwards and backwards, it is an ideal way of synchronising computer MIDI sequencing equipment to tape.

> *"an ideal way of synchronising computer MIDI.... to tape"*

Units which write SMPTE data produce an audio-type signal which can be recorded on one track of a multi-track tape recording machine. During playback, fast forward or rewind operations the track containing the 'SMPTE stripe' will be read by the SMPTE sync unit, enabling the tape position to be identified either during or after any amount of tape movement.

So far, this is all well and good. You have the SMPTE unit sitting between your MIDI/computer gear and the tape-recorder generating and reading the appropriate SMPTE info but this will only provide the tape-to-sync box communications connection. The sequencer (or whatever package is running) needs to be given that same time stamp information. There are two basic approaches to this. One is to provide direct computer-to-sync box hardware links (this is done with units like Dr T's *Phantom* interface). Another way to lock computerised MIDI gear into this SMPTE time frame is to use MIDI time code (MTC).

QUARTER TIME

MIDI time code is the MIDI message equivalent of the SMPTE time frame standard. There are actually three message variants, but the one that is most important from the real-time SMPTE user's viewpoint is called the 'quarter frame message'. This is a 2-byte System Common MIDI message which adopts the format shown here on the left in Figure 1.

The quarter frame message can hold eight different types of time information. As you can see, the seven bits of data held in a quarter frame MTC message are split into two parts. The first three bits identify the type of time data contained in the message, using the encoding scheme shown directly below in Figure 2.

Value of 'nnn':	Message type:	
0	Frame count	least significant four bits
1	Frame count	most significant four bits
2	Seconds count	least significant four bits
3	Seconds count	most significant four bits
4	Minutes count	least significant four bits
5	Minutes count	most significant four bits
6	Hours count	least significant four bits
7	Hours count	most significant four bits

Figure 2: The value of 'nnn' shows what sort of time data is being sent

To send a complete SMPTE time data description all eight of these message subtypes need to be transmitted, and so these MTC messages should really be thought of as occurring in groups of eight. When a SMPTE sync box is reading time code data and generating MTC messages at normal playing speed it will be transmitting this type of information continuously. However, during fast-forward or rewind what usually happens is that the sync unit will wait until the tape stops and then transmit a message giving the final SMPTE position.

The computer-tape connection is therefore built up of two parts, both of which rely on the SMPTE time stamp standard. Real SMPTE code handles the tape-to-SMPTE sync unit part of the story, MIDI time code handles the SMPTE sync unit to computer link, and nowadays it usually all fits together quite well. There are four variants of SMPTE code but even the fastest real-time data (which time stamps at 30 frames per second) is easily handled – in fact MTC requires less than 8% of the MIDI bandwidth for its data. In other words, its use produces a loading of less than 8% of the full capacity of a MIDI line when sending messages at the maximum rate possible.

> *"MTC requires less than 8% of the MIDI bandwidth for its data"*

Having said that, I'd be less than honest if I said that MTC-related MIDI problems do not exist. There is actually an awful lot more to the SMPTE/MTC story and programming-wise it becomes quite complicated. Variations in interpretations of the MIDI standard, and in the extent (or the lack) of MTC support will obviously directly affect the success of such applications program SMPTE/MTC links. To be frank it is usually best to see any SMPTE/MTC unit actually running with your chosen MIDI software before buying!

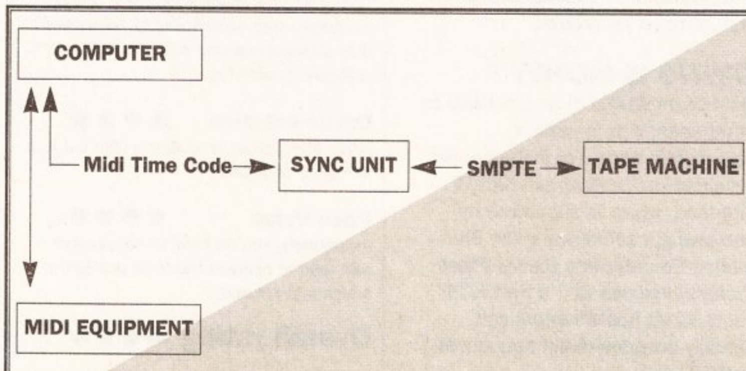


Figure 3: The SMPTE-MTC time frame communication scheme

OTHER MESSAGES

Although the quarter frame messages handle the bulk of the real-time work they are not always suitable. In cases where a lot of fast-forwarding, rewinding and cueing operations are being carried out, the MIDI standard provides a special 'Full time code' message that can be sandwiched inside a conventional system-exclusive message.

Another sysex-orientated MTC message, which is intended mainly for professional users, allows for special 'User Bit' information. User Bit data consists of 32 bits of application-specific data. The SMPTE standard enables this additional information to be used for encoding things like tape-reel numbers and other hardware- or device-specific header data. AS

CRACKING the shell

In the second part of this AmigaDOS 3 special, Mark Smiddy explains the mysteries of the new startup-sequence

The change from AmigaDOS 1.3 to 2.04 was a giant leap forward – and the unexpected release of version 3 came as quite a shock, with more new features, subtly updated commands and plenty more besides. In this feature I'm concentrating on the startup-sequence, a classic source of confusion, and letting you into two secret commands that crept in with this release.

If you're lucky enough to own an Amiga 1200, or are one of the chosen few to have an A4000, your startup-sequence will look something like the one shown in Listing 1. (The version number and release date – line 1 – will give you a better clue.) This startup-sequence is similar whether your machine is hard or floppy disk based – the changes are noted in the text. Here's how it works:

> *"two secret commands... crept in with this release"*

1. This is the script's version string. The ';' at the start of the line tells the AmigaDOS script interpreter to ignore the line: programmers would call this a 'remark' or 'comment' line. In AmigaDOS 3, however, there is more to this than meets the eye: the VERSION command has been updated (again) and can now read a version string directly from a script! If you haven't tried this command before, then now is a good time to start. Here are a couple of examples to get you going:

```
VERSION S:Startup-Sequence ↵
FULL
SPAT VERSION S:#?
```

The command looks for a special four-part string in the first line of the text file, like this:

```
$VER: ScriptName
Version Date
```

The first three parts must be present for the version string to be valid, and the date will only be printed when the FULL switch is present on the command line.

2. Patches late-breaking bugs in the system software. (Since I was using a beta-release ROM, it is not possible to say exactly what the latest fixes are.) The QUIET switch is a new option and replaces redirection to NIL: as found in earlier versions. It is important to note that Commodore has realised AmigaDOS reads commands faster if the path is specified rather than implied – so all external commands, like SETPATCH in this case, begin with 'C:'. In earlier releases of the software the startup-sequence relied on the default path setting and searched the current directory first. The speed increase, while not vast, is apparent.

3. This reads the current system variables for Workbench and Kickstart and stores them in two

BY POPULAR REQUEST

There was a time when the only way to get a confirmation in a script file was to use the ASK command. But this is both tedious and limited. Now, wouldn't it have been much nicer if you could just pop up a little alert requester which asked the user to click on the right button?

With AmigaDOS 3, this has finally been made possible, with the inclusion of REQUESTCHOICE. All you have to do is give the window a title, some text and some gadget text and AmigaDOS does the rest. Here's what the command looks like in full:

```
Synopsis: REQUESTCHOICE:
<TITLE> <BODY> <GADGETS...>
[PUBSCREEN=Screen]
Template:
TITLE/A,BODY/A,GADGETS/M,
PUBSCREEN/K
```

This command is a breeze to use, as this fragment demonstrates:

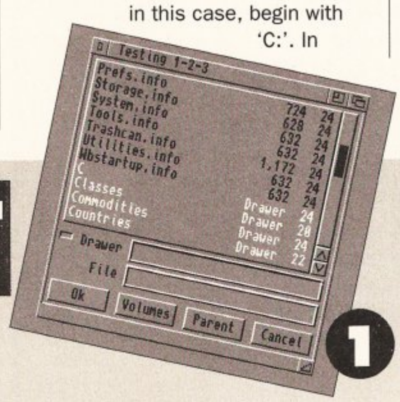
```
REQUESTCHOICE >ENV:Answer ↵
"Subs" "Want to Subscribe?" ↵
"YES" "NO" "CANCEL"
IF $Answer EQ "0"
 echo "Why didn't you ↵
answer my question?"
ENDIF
IF $Answer EQ "1"
 echo "What a good idea"
ENDIF
IF $Answer EQ "2"
 echo "Better reserve a ↵
copy at your newsagent then"
ENDIF
```

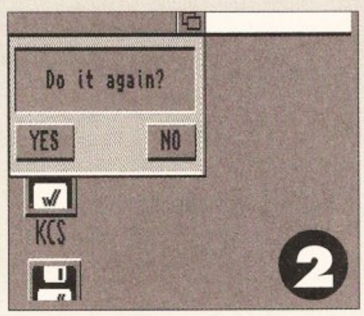
There is no need to enclose all the arguments in quotes as shown here, but this does make the meaning clearer and avoids some embarrassing requesters where part of the question becomes the gadgets. The number of buttons is limited by the width of the screen, so unless you are working on a known public screen, it is best to keep the width to the minimum. The buttons are numbered from 1 upwards from left-to-right, with the exception of the extreme right-hand button: this always returns 0 and should be kept as a CANCEL (take no action) gadget.

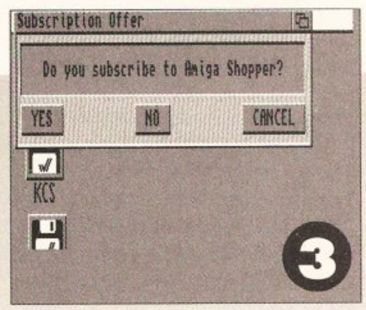
FINDING A FILE

Another new command added to AmigaDOS 3 is REQUESTFILE. This produces a file requester which can be used to select files – just as you might from an application program. Such things, though possible in earlier versions, have never been so easy. A quick look at this command is all space allows this month (just check out its synopsis!) but I will give it more coverage at a later date. The example script fragment provided here should get you started:

```
Synopsis: [DRAWER]
[FILE=name] [PATTERN=pat]
[TITLE=title] [POSITIVE=pos]
[NEGATIVE=neg]
[ACCEPTPATTERN=pat]
[REJECTPATTERN=pat]
[SAVEMODE] [MULTISELECT]
[DRAWERSONLY] [NOICONS]
[PUBSCREEN=screen]
```







1. As you can see, REQUESTFILE is an incredibly handy command that offers full control of the Amiga's standard file requester
2. This is a simple, two-button REQUESTCHOICE – taken from the REQUESTFILE example
3. A more complex requester using REQUESTFILE. Note that the CANCEL button should always be the extreme right-hand selection

EXAMPLE SCRIPT

```
LAB start
REQUESTFILE >ENV:FileName ↵
TITLE="Testing 1-2-3"
ECHO You chose $Filename
REQUESTCHOICE >ENV:YesNo "" ↵
"Do it again?" "YES" "NO"
IF $YesNo EQ "1"
 SKIP start BACK
ENDIF
```

local environmental variables: WORKBENCH and KICKSTART. This command does not have a QUIET switch so re-direction to NIL: is used to suppress the output. Screen display at any point during startup will force Intuition to open a default screen and window – this is something we don't want, as it should be handled by IPREFS.

4. Allocates about 7K of cache buffer to the internal drive. Re-direction to NIL: prevents the command from generating output. If you have sufficient memory, this value can be increased to between 20 and 25. Second external drives can also be buffered here.

5. Raises the failure level to 21, above the fatal error stage. This prevents commands such as COPY and MAKEDIR from bringing the script to an unexpected (and undesirable) halt before the screen becomes visible in Step 36.

6. Creates the following directories using MAKEDIR's new multiple argument parser (present in versions from 2.04 onwards):

RAM:T (for temporary files)
RAM:Clipboards (clipboard unit files)
RAM:ENV (global environmental variables)
RAM:ENV/Sys (System-wide environmental – Prefs – settings)

7. Copies the contents of the environmental variable archive (ENVARC:) to the RAM disk. ENVARC: is an automatic assignment created when the machine is booted – a feature introduced for 2.04.

LISTING 1: THE AMIGADOS 3.0 STARTUP-SEQUENCE

```
1. ; $VER: Startup-sequence 39.9 (9.8.92)
2. C:SetPatch QUIET
3. C:Version >NIL:
4. C:AddBuffers >NIL: DF0: 15
5. FailAt 21
6. C:MakeDir RAM:T RAM:Clipboards RAM:ENV RAM:ENV/Sys
7. C:Copy >NIL: ENVARC: RAM:ENV ALL NOREQ
8. Resident >NIL: C:Assign PURE
9. Resident >NIL: C:Execute PURE
10. Assign >NIL: ENV: RAM:ENV
11. Assign >NIL: T: RAM:T
12. Assign >NIL: CLIPS: RAM:Clipboards
13. Assign >NIL: REXX: S:
14. Assign >NIL: PRINTERS: DEVS:Printers
15. Assign >NIL: KEYMAPS: DEVS:Keymaps
16. Assign >NIL: LOCALE: SYS:Locale
17. Assign >NIL: LIBS: SYS:Classes ADD
18. Assign >NIL: HELP: LOCALE:Help DEFER
19. IF NOT EXISTS SYS:Fonts
20.  Assign FONTS:
21. EndIF
22. BindDrivers
23. C:Mount >NIL: DEVS:DOSDrivers/~(#?.info)
24. IF EXISTS DEVS:Monitors
25.  IF EXISTS DEVS:Monitors/VGAOnly
26.   DEVS:Monitors/VGAOnly
27.  EndIF
28.  C:List >NIL: DEVS:Monitors/~(#?.info|VGAOnly) TO T:M ↵
LFORMAT "DEVS:Monitors/%s"
29.  Execute T:M
30.  C:Delete >NIL: T:M
31. EndIF
32. SetEnv Workbench $Workbench
33. SetEnv Kickstart $Kickstart
34. UnSet Workbench
35. UnSet Kickstart
36. C:IPrefs
37. C:ConClip
38. Path >NIL: RAM: C: SYS:Utilities SYS:Rexxc SYS:System ↵
S: SYS:Prefs SYS:WBStartup SYS:Tools SYS:Tools/Commodities
39. IF EXISTS S:User-Startup
40.  Execute S:User-Startup
41. EndIF
42. Resident Execute REMOVE
43. Resident Assign REMOVE
44. C:LoadWB
45. EndCLI >NIL:
```

8-9. Make ASSIGN and EXECUTE resident. The PURE switch is used in case the flag has been cleared for some reason. Redirection to NIL: is used to suppress error output ("PURE bit not set", for instance) if this does occur.

> ***"This directory makes access to printer drivers much simpler"***

10. Creates the ENV: assignment (logical directory). This directory is automatically temporary since it's held in RAM and is used for a variety of user and system variables.

11. Re-assigns the temporary directory to the RAM disk (T directory) for speed.

12. Creates the CLIPS: assignment and points it to the RAM disk's Clipboards directory. Large clipboards such as IFF files are stored here.

13. Creates the REXX: program assignment and points it to the scripts directory, S:. The S: assignment is made automatically when the machine is booted with a Workbench disk. REXX: can be assigned anywhere – you may even wish to create a separate directory for ARexx programs.

> ***"a real surprise... MOUNT has been given pattern matching!"***

14. Makes the long-awaited PRINTERS: assignment. This logical directory, which for downward compatibility should remain where it is, makes access to printer drivers much simpler. For instance, you can check which printers are installed by entering:

```
DIR PRINTERS:
```

as opposed to:

```
DIR DEVS:Printers
```

15. Does for keymap drivers what PRINTERS: did for printer drivers. Once again, for downward compatibility this assignment must be left alone.

16. Be careful! This line may not appear or may be different on floppy disk installations. Locale (the country localisation drivers and translators) are housed on a separate volume for floppy systems and in a directory on hard disk systems. This tells the system software where to look.

17. This line may not appear or may be different on floppy disk installations. This ADDs classes to the available libraries. Classes are translations for a variety of software interpreters – as we discussed in more detail last month.

18. Creates a late-binding assignment (HELP:) to LOCALE:Help. This is hidden in the system assignment list until something tries to access it – for instance, a command like:

```
DIR HELP:
```

At this point, AmigaDOS will search the LOCALE: assignment (a separate disk on a floppy-based installation) and lock 'help' to the help sub-directory it finds there. This is primarily used by developers and the system and so is actually of little consequence to end users.

19-21. Be careful! These lines may not appear or may be different on floppy disk installations.

19. Tests if a Fonts directory exists on the current system (boot) disk. If the directory is found then control jumps down to Step 21, otherwise it simply continues at Step 20.

20. Removes the automatic FONTS: assignment. This prevents the machine asking for a volume called FONTS whenever fonts are accessed.

21. Closes the IF...ENDIF construct opened at Step 19.

22. Attaches any software expansion drivers to the system. This, I suspect, has been retained for ancient compatibility.

23. This one is a real surprise... MOUNT has been given pattern matching! This means there is no longer any need to explicitly mount devices such as RAD and PIPE – instead these are copied from the Storage disk into the Devs/DosDrivers drawer (using Workbench if you prefer) and mounted automatically during startup. Each device driver has an accompanying '.info' file which explains the need for the '~(#?.info)'

pattern – meaning everything but '.info'. This has the side-effect that there is no longer a single mountlist for all devices, but in the event that is probably a good thing. Third-party mountlists can be placed in this DosDrivers drawer/directory to make the device active on startup; alternatively you may alter the User-Startup file.

24. Tests for the existence of the Monitors directory in DEVS:. If one is found, execution continues at Step 25, otherwise it skips to Step 31.

25. Checks for the file 'VGAOnly' in the DEVS:Monitors directory. If found, execution continues at Step 26, otherwise it jumps to Step 27.

26. Runs the VGAOnly monitor driver – there seems to be little rhyme or reason to this strategy, and I have been unable to test for its purpose.

27. Terminates the IF...ENDIF construct opened at 26.

28. Creates a script file in RAM: T containing a list of available monitors, like this:

```
DEVS:2024
DEVS:Multiscan
```

The actual contents of the file will vary depending on the contents of the DEVS:Monitors directory. You will find extra monitor drivers on your storage disk. A3000 owners with Multiscan monitors (for instance the CBM 1950) can use this feature to access the Productivity mode easily.

29. Runs the script file created in Step 28 and makes the monitors available. The main change here is that each monitor file is an executable module in its own right, thus rendering the 2.04 system commands ADDMONITOR and BINDMONITOR redundant.

> ***"there is no longer a single mountlist for all devices"***

30. Removes the temporary script created in Step 28 and cleans up the T: assignment.

31. Closes the IF...ENDIF construct opened at 24.

32. Sets the global environmental variable Workbench to the contents of the variable Workbench – the version number. These version numbers are generated by VERSION in Step 3.

33. As Step 32, but for Kickstart.

34. Clears the local environmental variable Workbench...

35. ...and does exactly the same again for Kickstart.

36. Runs IPREFS – which in turn sets the user preferences for the machine. The screen appears at this point, and not before – unless something has reported an error to screen. This will not normally happen since all commands capable of reporting something have their output sunk to the NIL: device.

37. Makes the clipboard active.

38. Sets the paths for Workbench. These allow you to access any part of the Workbench from the shell without needing to know where the actual command is – FORMAT is a good example of this.

39. Tests for the presence of a User-Startup script. If one is found execution continues at Step 40, otherwise it resumes at Step 41.

40. Runs the User-Startup sequence. This is the only bit you should touch until you really know your way around the machine.

41. Closes the IF...ENDIF construct opened at 39.

42-43. Remove EXECUTE and ASSIGN from the resident list and free some extra memory.

44. Activates the Workbench. Remember, this command only launches Workbench – it is not the complete Workbench program.

45. Closes the initial shell window and allows you to get started with the machine.

In spite of the apparent length of this startup-sequence, the whole thing executes in a few seconds – well, far less time than the original 1.3 startup took. Next month, we'll be taking a look at some fun scripts including one to time hard-boiled eggs to perfection. Who was it who said computers were boring? AS

As a special treat, this month's* Amiga Shopper *cover disk features AmigaDOS scripts from this and previous editions of* Cracking the Shell *– including* Compress, Error, Fail, Hexify, Istoo, Uncompress *and* Warn. *Turn to page 22 straight away for more details.

MANY HAPPY RETURNS

↵ ↵ ↵ ↵

Because of the width of the columns in Amiga Shopper, we occasionally have to break a command across two lines. Where this has happened, we use the ↵ symbol to indicate that you should not press the [Return] key at the end of the first line – just continue typing the second.

I'M WARNING YOU

Many AmigaDOS programs can return a status message to indicate when something has gone wrong. If the error condition is higher than a certain level (nine by default) AmigaDOS will stop a script. Now, the AmigaDOS command IF can be used to test for these conditions in scripts, but debugging a complex script with lots of tests can be a nightmare. It would therefore be easier if it were possible to trigger an error condition at any particular point when required and the force AmigaDOS to follow these routes.

Take this contrived script fragment as an example:

```
IF WARN
 echo "Something went wrong"
ELSE
 echo "Everything went to ↵
plan"
ENDIF
```

The whole meaning of this test can be negated by adding the NOT switch. This would then give you a script looking something like this:

```
IF NOT WARN
 echo "Everything was OK"
...
```

Debugging this can be a bind if you are not sure what return code a command is generating in any given situation. Just such a problem gave rise to these four little programs which force the following specific return codes:

OK	**0**	**Exit with no problem.**
WARN	**5**	**Non-fatal error/warning.**
ERROR	**10**	**Serious error.**
FAIL	**20**	**Very serious error.**

So when would these be useful? Let's say that you have a script which looks like this:

```
SEARCH RAM:Test "Internal"
IF WARN
...
```

Both instances can be tested using these programs, like this:

```
Check what happens after
WARN...

SEARCH RAM:Test "Internal"
WARN
IF WARN
...

Check what happens after an
all-clear...

SEARCH RAM:Test "Internal"
OK
IF WARN
...
```

HOW THEY WORK

AmigaDOS commands pass their return in the 68000 data register D0, so, as an example, here is the assembly code source for WARN:

```
err     EQ      5
        MOVEQ   #err,D0
        RTS
```

Three lines – that's it! In fact this tiny program generates quite a large piece of code because of the required header information. Assembler programmers have an easy time of it here because they only have to change the value for the error EQuate to 0, 10 or 20 and assemble to disk with the appropriate name. If you don't have an assembler, the four programs are listed below ready to be processed by a program like *UnHex* or *Hex2Bin* (see *Amiga Shopper* issue 20). Since only one byte (two characters) and the checksum change, only 'OK' has been listed in full – you can just replace line three with the appropriate version and re-compile.

```
'OK'
1. 000003F3 00000000 ↵
00000001 00000000 07B4
2. 00000000 00000001 ↵
000003E9 00000001 10FA
3. 70004E75 000003F2 1FED

'WARN'
3. 70054E75 000003F2 2001

'ERROR'
3. 700A4E75 000003F2 2015

'FAIL'
3. 70144E75 000003F2 203D
```

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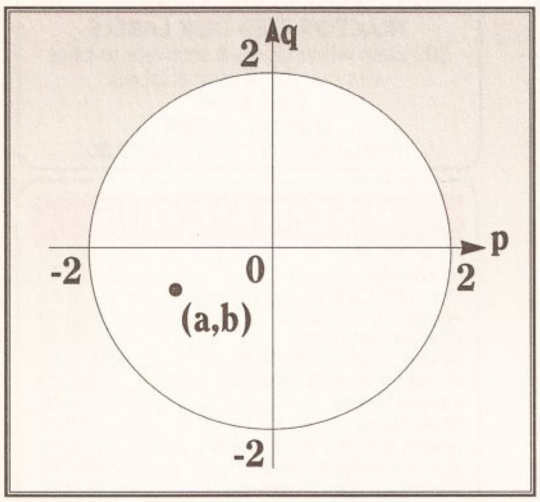
The story so far: in last month's issue of *Amiga Shopper*, we saw how interesting and versatile the Mandelbrot set can be. However, after years of publicity (both good and bad), the Mandelbrot set has gone somewhat out of fashion in the eyes of jaded chaos enthusiasts. And in its place, observers of mathematical trends have identified a suite of similar fractals, known as Julia sets, now steadily taking over the Mandelbrot's role as the 'fractal for the masses'.

Remarkably, Julia sets are plotted using exactly the same equations as the Mandelbrot set – the difference between them lies in the way the equations are applied. This close link between the two fractals means that Julia sets provide just as much scope for experimentation as their more famous counterpart. Zooming in, adding internal structure and rendering in three dimensions are all possible. Furthermore, while the Mandelbrot is a single fractal, there are an infinite number of Julia sets to explore.

4 INTO 2 WON'T GO

Earlier in this series we met the Lorenz attractor, which was based on three equations containing three variables: **x**, **y** and **z**. At the time, we noticed that the system could be treated as being three dimensional, because it had three variables. In the first article about the Mandelbrot set we found that the Mandelbrot equations involved the four variables **a**, **b**, **p** and **q**. Following the theory of the Lorenz equations we now see that the Mandelbrot set can be treated as a four-dimensional object.

While it is challenging enough to represent three-dimensional objects on the Amiga's flat screen, displaying a four-dimensional object is practically impossible. To overcome this problem only two variables from the Mandelbrot equation are used to plot the set. These are **a** and **b** which are used to position each point – **p** and **q** are used in the calculations but are later discarded. By concentrating on the **(p,q)** variable pair instead of the **(a,b)** pair we can produce Julia sets.



The familiar Mandelbrot circle, with initial point (a,b). For Julia sets, (a,b) is chosen at the start of the program and then stays constant throughout the process

THE JULIA PROCESS

The first part of the process is almost identical to the Mandelbrot process, and even takes place in the same old Mandelbrot circle (shown on the left). Inside the circle there is a single point which starts off at the position **(a,b)** – that is, **a** in the horizontal direction and **b** in the vertical direction. The Mandelbrot equations (shown below) are then repeatedly applied to make the point move around in the circle.

```
pnew = p*p - q*q + a
qnew = 2*p*q + b
p = pnew
q = qnew
```

In the Mandelbrot process, both **p** and **q** were set to zero before the first iteration was performed. In the Julia process any initial values of **p** and **q** can be used, in the range –2 to 2. Apart from this small difference the process in the circle works in exactly the same way as for the Mandelbrot set.

It is easy to write an Amiga BASIC program to plot the path of the point in the circle, based on the Mandelbrot circle program given earlier in this series. We can still use the Pythagoras theorem to detect when the point breaches the circle – so, if **p*p+q*q>4** then we know that the point has left the circle.

LISTING 1 • LISTING 1 • LISTING 1

```
DEFDBL a,b,p,q,x,y,pnew,qnew
DEFINT iteration
'
REM Set constants (easily editable for any set)
a=0.32
b=0.04
'
REM Plot set
FOR x=-2 TO 2 STEP .01
  FOR y=-2 TO 2 STEP .02
    p=x
    q=y
    iteration=0
    WHILE (p*p+q*q<4) AND (iteration<32)
      pnew=p*p-q*q+a
      qnew=2*p*q+b
      p=pnew
      q=qnew
      iteration=iteration+1
    WEND
    IF iteration<32 THEN
      PSET(320+x*100,100-y*50)
    END IF
  NEXT y
NEXT x
```

The key to generating a Julia set is to determine the behaviour of all possible sets of initial values of **p** and **q** and put them into one of the following categories:

1. **Those whose paths accelerate to infinity**

2. **Those whose paths never leave the circle**

The assumption that if a point breaches the boundary of the Mandelbrot circle it will eventually reach infinity is employed to categorise the 'category one' points. As in the Mandelbrot process, we assume that the point is of 'category two' if it has not left the circle after a given number of iterations (known as the 'iteration ceiling'). A typical Julia iteration ceiling is 32.

By plotting all the category one points on the screen at their relevant positions we get a Julia set similar to the lower one shown on the facing page. Of course we don't check every possible pair of initial values for **p** and **q**, as there are an infinite number of them. Instead we take regularly spaced samples to get an approximation of the Julia set.

INTO INFINITY

Note that the initial position **(a,b)** is kept constant throughout the drawing of the set. It is this constant which determines which Julia set is drawn. And because there are an infinite number of possible values for **a** and **b** within the range –2 to 2 there are an infinite variety of sets which can be produced using the Julia process, each with a unique initial position constant **(a,b)**. In most chaos literature this constant is expressed in the form **a+bi**, because of links between the original Julia process and complex numbers.

The Amiga BASIC program in Listing 1 draws the Julia set with constants **a=0.32** and **b=0.04** (which would be '0.32+0.04i' when expressed in 'complex' form). To produce a different set, just change the lines which set the values of **a** and **b**. Some interesting values are shown below:

a	b
–1.16	–0.25
0.32	0.04
–1.25	–0.01
0.00	–1.00

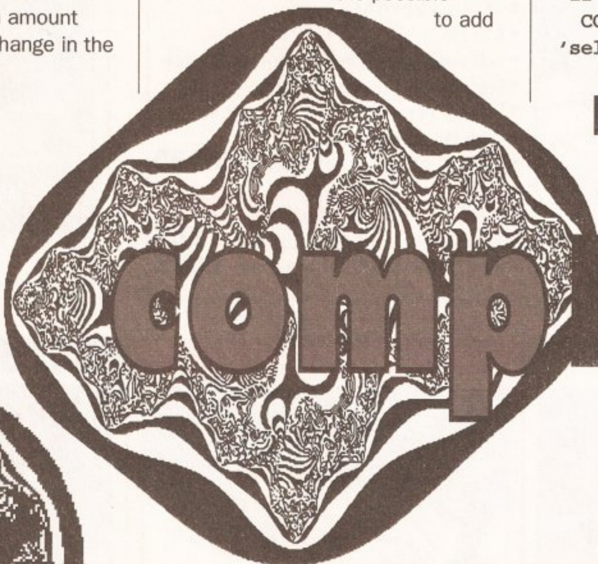
In many respects this program is similar to the equivalent Mandelbrot example given earlier in the series. Because the Julia plane extends from –2 to 2 in both directions, as in the Mandelbrot set, even the scaling is the same. The main differences are that **a** and **b** are set as constants at the start of the program and **p** and **q**, instead of being set to zero at the start of the circle process, are given

Fractal

The programs given in this series have been designed to be as short and easy-to-understand as possible. However, this has been at the cost of speed and user-friendliness. If you want to really experiment with fractals such as the Mandelbrot and Julia sets, then you need to get hold of a 'fractal explorer' program.

Many of these are public domain, so they shouldn't cost you the earth. They are usually written in optimised C or assembler code, and so allow you to plot and manipulate fractals very quickly. Although there is no need for any mathematical or programming skills, many explorers include source code and detailed documentation, so if you want you can learn about the optimisation techniques used and even incorporate your own routines into the program.

The complete set



A Julia set with internal structure

The Mandelbrot set may well be infinite – but most of it looks the same! Conrad Bessant puts the variety back into your fractals by introducing the versatile (and far more fashionable) Julia sets

values (**x** and **y**) derived from the nested FOR...NEXT loops.

ADDING CONTOURS

Contours can be added to Julia sets via the same method which we used for the Mandelbrot set. The contours are created by colouring points depending on the ease with which they left the circle. The relevant 16-colour replacement lines for the IF...END IF section of the program are as follows:

```
COLOR iteration MOD 16 ↲
'Set colour
PSET(320+x*100,100-y*50) ↲
'Plot point
```

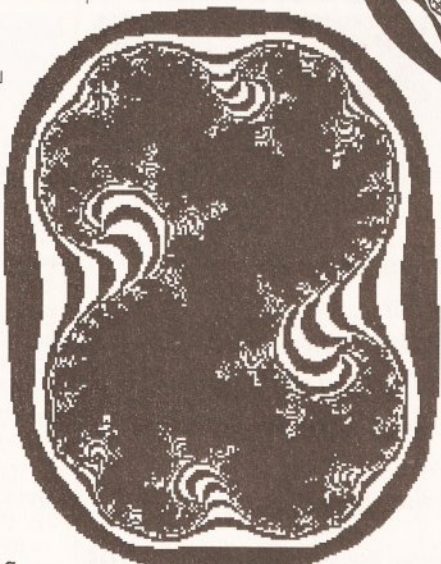
In order for this replacement to work, it is necessary to open a 16-colour window by inserting the following lines at the start of Listing 1:

```
SCREEN 1,640,200,4,2
WINDOW 2,"Colour Julia ↲
Set",(0,0)- ↲
(617,180),15,1
```

ZOOMING IN

As with the Mandelbrot set, there is a lot to be gained by zooming into Julia sets and examining them in more detail. The zooming method is very similar to that used for the Mandelbrot set last month. As a reminder, the steps are:

- Choose an area to enlarge.
- Work out the range of **p** and **q** associated with this region – make sure that both ranges are reduced by the same proportion to preserve the aspect ratio (the ratio of width to height).
- Alter the **x** and **y** FOR...NEXT lines to incorporate the new ranges of **p** and **q**.
- Reduce the STEP sizes of the FOR...NEXT lines by an amount corresponding to the change in the ranges of **p** and **q**.
- Edit the multiplication factors and offsets in the PSET line to make the region fill as much of the screen as possible – again, be sure to preserve the aspect ratio.



Listing 1 produces this Julia set

You may have to increase the iteration ceiling (in the WHILE line) from 32 to show more detail, so the set may take longer to be drawn.

INTERNAL STRUCTURE

The inside of Julia sets are traditionally coloured black. However, it is possible to add internal contours to the set, just as we did last month with the Mandelbrot set. A suggested replacement for the colour setting section is given below, but you can really try any method you like.

```
IF iteration<32 THEN ↲
'If outside set...
  COLOR iteration MOD 16 ↲
'select colour normally
ELSE            'Otherwise...
  COLOR INT(5*ABS(LOG ↲
(p*p+q*q))) MOD 16 ↲
'use internal method
END IF
```

Julia sets provide by far the largest scope for further experimentation out of all the fractals which we will meet in this series. With an almost infinite number of Julia sets to explore, and so many variations, the possibilities are virtually boundless.

NATURAL INGREDIENTS

So far, we've used the Amiga to generate a host of popular, but abstract, fractals which demonstrate the basics of chaos theory. In the next couple of installments we'll move on to the role of chaos theory in imitating nature, kicking off next month with an introduction to the principles of fractal plant generation.

The Chaos listing is on this month's cover disk – see page 22!

Explorers

The most common type of fractal explorer is the Mandelbrot generator. Examples include *Quick Mandelbrot (QMan), Turbo Mandel, Mandel Mountains, SMan, MandAnim, Mandelbrot Adventure Kit (MAK), Slicer, Fracgen* and *MandelPAUG*. All of these include Intuition interfaces, disk filing facilities, and a selection of other features such as three-dimensional plotting, colour cycling and animation. These programs are all very fast, often using optimised assembler or C code. By way of example, *MandelPAUG* will plot the whole Mandelbrot set in a couple of minutes on a standard Amiga 500.

In order to make their Mandelbrot generators stand out from the crowd programmers have been adding more and more features. For example *MandelPAUG* and *Slicer* can both be used to plot Julia sets. In addition, *Slicer* calculates and stores the whole set in memory, allowing it to be rendered in a number of ways without the need for time-consuming recalculation. *SMan's* gimmick is support for a maths co-processor, which allows it to handle magnification factors of 1019.

Other programs which are relevant to this series of articles include *Fractal Construction Set (FCS)* which can plot, among other things, the Sierpinski triangle. Another program, *FractalLab,* allows you to investigate self-similar curves (which we touch on next month).

Fractal landscapes (which we will also meet later in the series) are quite well supported, although *Fracscape* is the only noteworthy PD offering. Commercial programs like *Vista* and *Genesis* make it easy to render high quality landscapes with trees, lakes and snow. A demonstration version of *Genesis* is available in the public domain.

WRITING YOUR OWN

Writing a fractal explorer program, whether for yourself or for distribution in the public domain, is interesting, educational and rewarding. It's best to write the bulk of the program in a high-level compiled language such as GFA BASIC or C and, if you can, write the actual fractal plotting routine in assembler for speed.

If you want your program to be a success in the public domain then you should make it stand out from the crowd – add extra features such as quasi-Mandelbrot and internal structure options, or forget the Mandelbrot set altogether and concentrate on another type of fractal. Remember that an Intuition interface, zooming in, changing colours and load/save options are now considered standard features.

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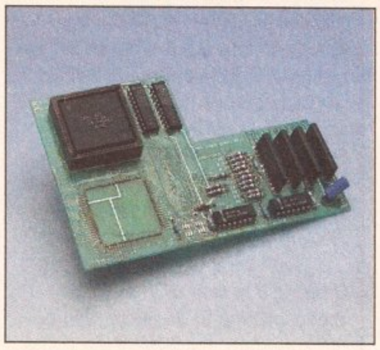
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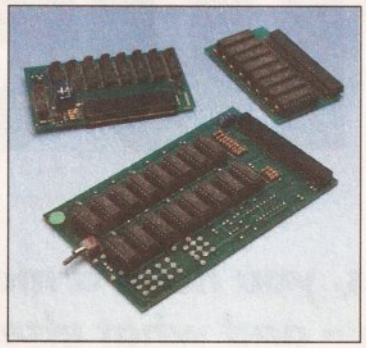
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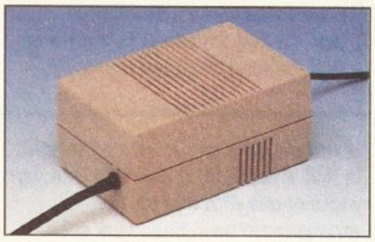
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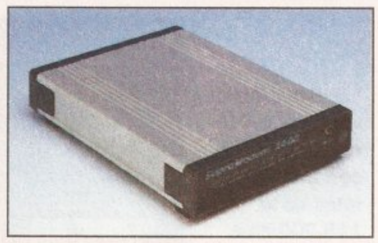
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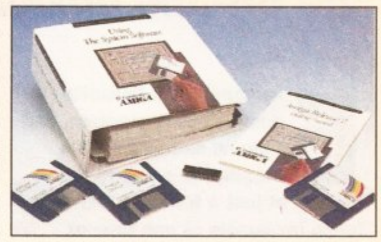
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LITTLE Helpers

To get into comms, you need a modem, some suitable software – and what else? Smiling Dave Winder recommends some handy utilities to make life on-line easier

Everyone has a favourite comms utility program, and I am no exception. This month, I'm going to be looking at just a few that I have found invaluable at one time or another over the years. All the following programs are either PD or shareware, and one of them is provided for you on this month's cover disk. You should be able to download the rest from your local bulletin board's file area – if it keeps things up to date. They are also available from the Amiga conference on CIX.

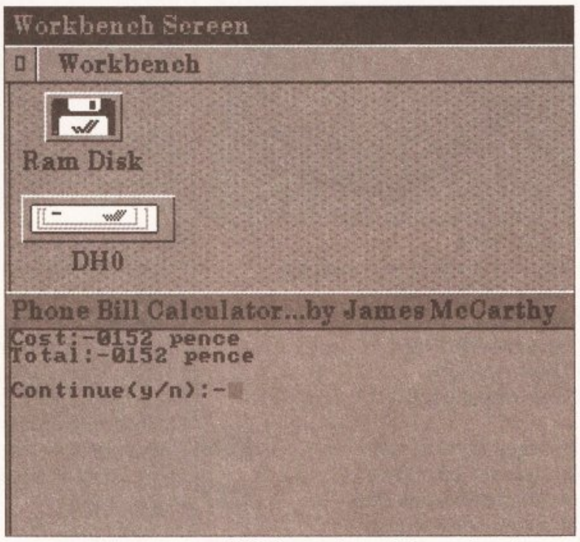
If you have a comms utility that you could not live without, or if you have written one of your own, why not let me (and thousands of readers) know about it? Contact me at *Amiga Shopper* or via CIX, and perhaps your favourite will find its way into print. But, for the meantime, here's my personal 'fab four'!

THE BAUD BANDIT

This program is really aimed at those of you who have a very high speed modem. It is a replacement for the standard 'serial.device' that comes with your Amiga. When the serial.device was written, Commodore did not know of the advances that would come with high speed modems. As a result, your system can slow down significantly when transferring a file at a high speed. *Baud Bandit* solves that problem, claiming to provide a speed increase of some 500% over the standard serial.device – a claim that I am certainly not going to refute. What this means in real terms is that I can now let my Amiga get on with doing other things while it is downloading a 1Mb file at a speed of 14,400 bps, without the system slowing down to a halt.

Baud Bandit will allow you to drive your serial port at baud rates up to 115,200 on a standard 68000 Amiga with full multitasking. It is simple to install – all you have to do is copy it to the Devs directory and then reconfigure your terminal software so that it uses the new 'BaudBandit.device' instead of the usual serial.device.

Earlier versions of *Baud Bandit* were public domain programs, but the latest release (version 1.4c) has become shareware. This means that if you use it you have to pay for it, and, as it is from a German author, you will need to send him 20 Deutsche Marks. Many people worry about sending foreign money to what is just a name in a '.doc' file, but my experiences with this sort of arrangement have been very good. I have always received a registered (and usually considerably improved) version of the program within a few weeks of sending the cash.



***BillCalc* works out the costs of your calls – to within an accuracy of 5p**

BILLCALC

BillCalc is a very simple program indeed, but incredibly useful none the less. All it does is calculate the cost of your phone calls. You just type the answer to a series of questions regarding your call and *BillCalc* will respond with the total charge incurred.

The results are accurate to within 5p, which is good enough for most people, and, believe me, it is handy to see how much all those long

BOOK REVIEW

READ ALL ABOUT IT

I am often asked what the best way is to find out a little about the exciting world of comms, before actually taking the plunge and buying that modem. Well, apart from recommending this column (of course), the answer I give is to get a copy of Hugo Cornwall's _New Hacker's Handbook._

Don't be fooled by the title into thinking it is only of interest to those wishing to do illegal things via a modem, because it isn't. The information contained within is written in such a way as to be useful to anyone who is already a committed comms enthusiast, or is just dipping their toes in the water and thinking of buying a modem.

(-: WHEN YOU'RE SMILING :-)

The small and simple text messages that you'll see on most bulletin boards or conferencing systems are ideal for exchanging factual information. But if you give it a bit of thought, you will soon realise that it can be very hard to get any indication of emotion across using them. For example, the message "Get outta here!" could be interpreted as a sign of disbelief, or as marching orders.

It is precisely this sort of misunderstanding that leads to most of the abusive messages (also known as 'flames') that get sent on these text-based systems. So how can you make your message that bit clearer? I'll tell you how – using 'smileys' (or 'Emote Icons', as our friends across the big pond call them).

FACING THE TRUTH

In its simplest form, the smiley looks like this **:-)** (you will need to turn the page sideways to see it in all its glory). It is a very simple text-formed graphic, which you add to your writing to express emotion. These smileys have become so popular in the last few years that it is now almost impossible to find a bulletin board message that doesn't have a smiley of one sort or another attached to it.

I like them so much that I have even started including them on written letters I send to people. Once the recipient realises what they mean, I find that they too start replying using liberal doses of 'emote icons' (sometimes shortened to 'emoticons'). Maybe 1993 will be the year of the smiley? What do you think? Anyway, to help you along, I've put together a small guide to some of the most popular smileys being used at the moment, which you'll find in the box on the facing page. And, if you are a real smiley fan, you'll be pleased to hear that you can talk to like-minded folk in the 'smiley' conference on CIX.

HISTORY TODAY

The history of computer-to-computer communications is covered in some depth in Chapter Two of the handbook. As well as being a fascinating read, this also introduces the beginner to the whole spectrum of comms terminology in an accessible way. Other chapters cover the equipment you need, networks, and the like.

The chapters that are aimed squarely at the 'hacker' have titles such as 'Targets' and 'Intelligence', and are also full of little gems of information for the enthusiast or beginner. They are useful for knowing what sort of information is out there, where to find it, how to navigate around different computer systems, and so on.

There are also some fascinating anecdotes and reports on the history of hacking, and while I cannot condone such illegal activities, they do make incredibly interesting reading.

However, there is one criticism I feel I should make: I found it a little annoying that many of the examples are illustrated by simulated screenshots, so the text looks the same as it would appear on a cheap printer or terminal screen. While this does, I assume, attempt to make the reader feel that they are participating in the on-line experience, it also makes the text very difficult on the eye and therefore does not aid the reading process at all.

Some of the best parts of the *New Hacker's Handbook*, however, are the appendices at the back. These cover modem problems trouble shooting, a comms glossary, explanations of those ubiquitous 'V' numbers, and file transfer protocols – there's even a section on viruses. I use the glossary myself quite regularly, as it is amazing how often a new or unfamiliar term crops up and you realise you don't know exactly what it means.

A SOUND FOUNDATION

Although the last reprint of this book that I know of was in 1990, don't let that put you off. Even allowing for the fact that the technology has advanced a long way in those few years, this book still covers the groundwork in a way that no other can match. If you are a comms enthusiast, thinking about becoming one, or even just fancy a darned good read, I would recommend this book without hesitation.

However, I should also give you a brief word of warning. The *New Hacker's Handbook* isn't aimed at the computer novice – you need to have a basic understanding of computers to make the best sense of it all, although, as I have already said, the glossary is very good. It must also be pointed out that the book is all about comms and is not machine specific, which means that you will find nothing about the Amiga here. However, the Amiga isn't really the important part of your comms system, so don't worry too much about that – most of the information contained in this book will be of as much use to an Amiga user as to anyone else. Pester your local library to order it for you, or try around specialist bookshops.

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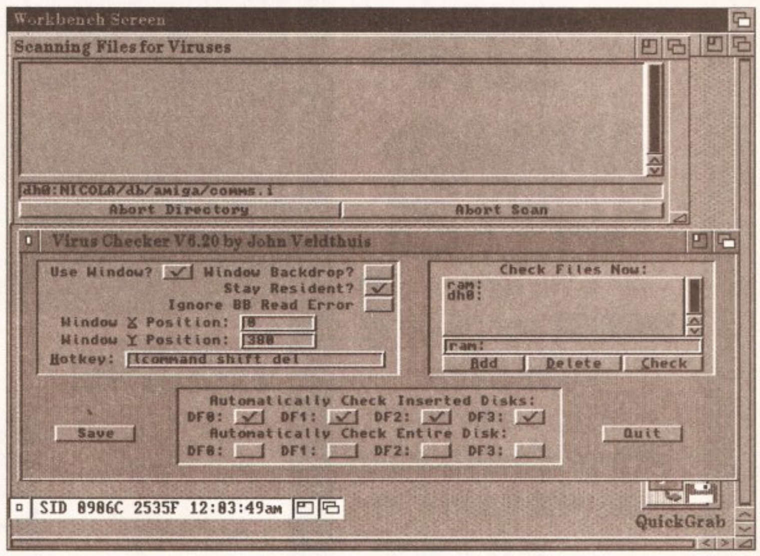
The New Hacker's Handbook...£9.99

By Hugo Cornwall
Published by Steve Gold

ISBN 0-7126-3454-1

THE AMIGA SHOPPER SMILEY GUIDE

- **:-)** Happy. Denotes humourous intent.
- **:-(** Unhappy. Denotes displeasure.
- **;-)** Winking smiley. Denotes message not to be taken seriously.
- **:^)** Denotes nose out of joint (can be happy or sad).
- **:-*** Kissing smiley.
- **%-)** Drunken smiley. Denotes condition of writer.
- **:-P** Tongue sticking out (or tongue in cheek).
- **:-O** Shocked smiley.
- **:-|** Seriously miffed smiley.
- **B-)** Smiley wearing glasses.
- **:-))))** A very happy smiley.
- **:-((((** A very unhappy smiley.
- **:'(** A crying smiley. Denotes extreme sadness.
- **:-&** Tongue-tied smiley. Denotes "I know what I mean".
- **8-)** Boggle-eyed smiley. Denotes shock.
- **:-Q** Cigarette-smoking smiley.
- **:-#** Gagged smiley – trying not to say something.
- **:-@** Another sticking tongue out smiley.
- **:-|** Denotes indifference.
- **:-!** Denotes foot in mouth.
- **:-D** Laughing out loud smiley.
- **:-X** My lips are sealed smiley.
- **O:-)** Saint Smiley. Denotes total innocence.
- **.-)** Keeping an eye out for something.
- **(:-)** Bald smiley.
- **(-:** Left handed smiley.
- **:-/** Sceptical smiley.
- **|-)** Very tired smiley.



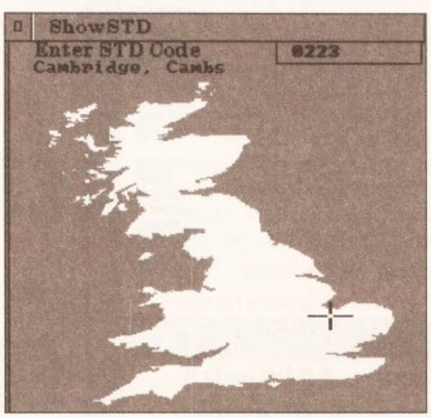
Regular use of a good anti-virus program will keep your files infection-free

distance calls are costing you!

The author of the program, James McCarthy, is British and readily admits that this is his first machine code project. *BillCalc* isn't perfect, but it is useful and, since it is freeware, it won't cost you a penny.

SHOWSTD

Out of all the little comms programs, this is one of my real favourites. Quite often when you are on-line, you will see a reference to an interesting-sounding bulletin board, with no mention of where in the UK it is based. This is where *ShowSTD* comes in. You just type in the STD code of the bulletin board, and *ShowSTD* not only tells you the corresponding area of the country but also shows you where it is on a small map of the UK.



Track down that elusive BBS, with the handy *ShowSTD* utility

OK, so there are other programs that give STD code areas, but this one is so nice and twee that is has to be included here. *ShowSTD* is freeware, and has a British author, Andrew Harrison. Andrew wrote the program because, as a newcomer to the comms scene, he found the lists of BBS numbers quite daunting – another example of how the comms community benefits from the work of its members. Well done Andrew.

VIRUS CHECKER

Finally, always remember to have a virus checker active. This is especially true when downloading files from bulletin boards. Now, the SysOp will do his or her best to ensure that all files on the Board are free from viruses – for example, I always download and check all files before making them available to members of the Amiga conference on CIX. However, it is always possible that one may slip through at some time. Indeed, it has been known for a a fake version of a virus checker to be a virus spreading device itself, so always be alert.

The best of the current virus checkers was included on the cover disk of *Amiga Shopper* Issue 21. *Virus Checker* by John Veldthuis is not only comprehensive and secure, but is updated very often as well. Indeed, in the short space of time since we brought you the cover disk in December, *Virus Checker* has been updated to version 6.20. So, where can you get hold of this very latest version? Why, on this month's cover disk, of course! AS

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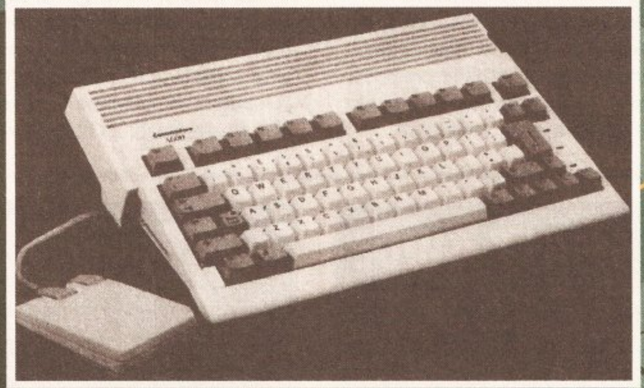
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BEGINNERS START HERE

New to the world of databases and data storage? Don't worry – all the most common questions are answered below!

Question: What's a database?
Answer: Quite simply, it is a collection of related information. In most texts, a database is analogous to a list of items – the names and addresses in a telephone book, for instance. In fact, the entire UK telephone directory is nothing more than a huge database!

Question: So, how do records and fields fit into this?
Answer: Records are just sub-divisions of the database – the collection point where a set of related data is collected together.

For instance, in the phone directory, a person's name, address and telephone number constitute one record. Each item is stored in a single field.

Question: I've also heard of indexes – what do they do?
Answer: Most modern databases (including some flat-file ones) recognise the need to index data in some fashion. Indexes work like the index in a book – each record has an entry in the index which points to its position in the database. Indexes serve two purposes: to maintain the data in a pre-determined order, and to increase the data access speed. The original approach was to sort the entire database record-by-record, but in today's world that is much too processor- and storage-intensive. Relational databases use indexes to link common (related) records in two or more database files. A record's index number is also referred to as a 'key'.

Question: Could you explain the difference between unique and non-unique indexes?
Answer: Generally speaking, an index is a code number generated by the contents of one or more fields. Simple indexes are (usually) calculated from the contents of a single field, while complex ones are generated from several fields. Unique indexes are only useful in relational databases where a record must occur just once in the data. If a unique index is generated on one field – as will usually be the case – then that field's contents must be unique to every record in the database. Many applications use the record number to generate the contents of such a field.

Non-unique (or common) indexes are generated from any field or group of fields where the data may be the same. A typical example of this might be an index based on a person's surname or forename and surname together. There may well not be more than one Mark Smiddy in the database, but there are certainly plenty of John Smiths around.

Question: What are complex indexes for?
Answer: Some systems provide what is called a 'key search'. This allows you to locate data according to its index key. For instance, the name Smith generates a different key value to Ramshaw. However, since Smith is a very common name, the simple index will only point to the first Smith in the key list. However, if a complex index is used it is possible to generate keys based on a person's full name (for instance). Therefore, "Alan Smith" could be tracked down as easily as "Zena Smith", merely by entering their name.

Question: And finally, what's the difference between a flat-file and a relational database?
Answer: Relational databases are just extensions of the original flat-file concept; therefore, a relational application can be used for flat-file (or 'simple') databases but not vice-versa. In a flat-file database every record is a single entry in its own right, unattached to anything else. This is directly analogous to a conventional filing system using a Rolodex, file cards and so on – which explains why folk find flat-files easy to follow. Relational databases on the other hand, group and collate records like people do in the real world. For instance:

● The accounts department handle customers by a reference number. (In database terms, this is one 'data file'.)

● Credit control hold a file of customer's names, addresses and their account number. (This is a second data file.)

At the end of any month, the overdue account numbers are sent to credit control and the addresses of guilty parties can be retrieved by locating the appropriate account numbers in the customer file. One flat-file has been related to another – and that's all there is to it!

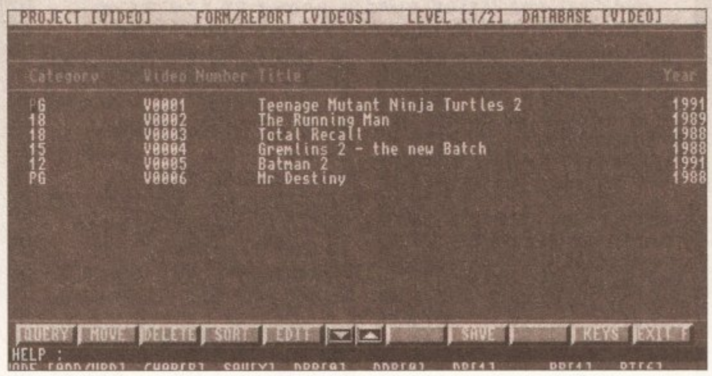
As far as the Amiga is concerned, database applications are rare beasts and the relational variants are about as common as flying pigs. There is a good reason for this: *Superbase*. The *Superbase* series of programs are so good, most developers have erred on the side of caution rather than attempt to re-invent the wheel. In designing *Superbase Amiga*, the folks at Precision did not just adapt the proverbial wheel, they added pneumatic tyres and a self-lubricating hub into the bargain.

suggested it was not remotely good enough to waste editorial space on.

The latest version promised a lot more at a lower cost, so here at last I can report on the only readily available relational database for the Amiga – with the notable exception of *Superbase*, of course.

STARTING ORDER

The first thing that becomes apparent when *Order* is first started, is its refusal to conform to accepted standards. *Order* opens on an NTSC (200-line) custom screen with one of the most unreadable palettes I have



A scroll format screen is limited to just 80 characters wide...

used – though you should see the box on the next page for details of how to change this.

But *Superbase* is past history: a classic in its own era, now wholly owned by Oxxi-Aegis.

South Hams walked where others feared to tread by releasing *Order*, a new relational database targeted directly at a market already dominated by another product. If size were to be taken into account this is the equivalent of Morgan cars taking on the might of Ford or General Motors. Nevertheless, encouraged by David's success in giving Goliath a serious headache, South Hams has prepared to take on the big guns. But the real problem with legend is things tend to get somewhat far-fetched or at least a little exaggerated. In the real world David wouldn't even have achieved his Scouts badge in knot-tying, never mind made a sling out of an old bit of cloth and knocked out a giant with one measly stone. No, things don't happen like that in the real world.

"...an unknown name and no track record isn't going to get you anywhere."

Nor do they in the computer industry, where an unknown name and no track record isn't going to get you anywhere – unless you have a lot of luck and an exceptionally good piece of software. Let the truth be told: when the first version of *Order* arrived at *Amiga Shopper*, five minutes of mucking around with it

Similarly, the manual supplied is home-grown and distinctly amateurish – I have seen better attempts describing more complex applications from shareware authors. The author seems incapable of grasping the rudiments of limited capitalisation as an aid to readability. "FOR MORE INFORMATION," it bellows in one memorable section, "LOOK UP 'KEY FIELDS' AND 'RELATIONSHIPS – ONE TOO MANY' IN THE INDEX AND TURN TO THE RELEVANT SECTION". Reading a tutorial structured like this brought back memories of an old English teacher pointing out "My eyes aren't deaf, boy!".

First impressions last – and it was some time before I could face up to the arduous task of giving *Order* a grilling that would be thorough and accurate enough to report upon in these pages.

Order breaks the rules because its design is based on a PC application, *Omnis 5* – admittedly, not a system I am intimately familiar with. (This ancestry could also explain – but not forgive – the choice of screen colours.)

Unlike *Superbase*, *Order*

Relative values

Mark Smiddy tests Order 2.03, a budget-priced relational database aimed at the home and semi-professional market

considers a database application to be a 'project'. That is to say, where *Superbase* can act upon any one or more database files at any time, *Order* gathers all those files together under one 'project' banner. Where *Superbase* allows unlimited access to many databases at once, *Order* considers each project file to be a receptacle containing one or more database files.

In the hierarchical scheme of things this places *Order* one level higher than *Superbase,* and so makes it easier for beginners to manage. There are pros and cons to either method, but where ease of use is most important, *Order* does have the edge.

BASIC INSTINCTS

That sadly, is where things start to fall apart at the seams, and *Order's* initially promising approach yet unprofessional nature shows through. Perhaps the major failing of the first release – and a main reason why the earlier version did not get featured – was the way even trivial operations required disk access. This, thankfully, has been fixed. Even so, *Order* is still a little slow on the uptake. This could be because it has been written in, dare I say it, BASIC.

There's nothing wrong with *HiSoft BASIC* – as compilers go it's one of the better ones and at least it doesn't fall apart under Workbench 3! But, I wonder, could this be the reason *Order* doesn't like to multi-task? Unlike any well-behaved Amiga application, *Order* grabs the system for itself and the custom screen sits there steadfastly refusing to be either depth-arranged or moved.

A simple keypress is all that's required to get Workbench back again, but even while *Order* is idle, things slow to a crawl. This would suggest that *Order* is running a processor-hungry main loop waiting for something to happen – but, whatever the reason is, it is still not good enough. Even my trusty Workbench 3 screen blanker couldn't get a look-in long enough to display some pretty patterns.

SETTING UP

As I have already outlined, *Order* considers a database project to be constructed from many data files. Once the project has been created and named, each database has to be similarly defined. Assuming they can overcome the manual's shortcomings, beginners will love this. Very little has been catered for: only 14 fields and three field types are possible: Character, Numeric and Date. There are no facilities for case alteration, input validation, external files, currency, time, mathematical functions or anything like that. Even the numeric fields are restricted to signed integers and dates to a simplistic DD-MM-YY!

At this stage I was left wondering, what can *Order* actually do with such a limited choice? Very basic database applications can get away with such a minimal choice of field types – but surely these could easily be satisfied with a 'flat-file' system? Well, this isn't entirely true, as South Hams points out in the tutorial which contained one of the few applications where relationality could be of use: a video database, in which relational links join common data – classification and leading roles, for instance.

THE ART OF MAKING AN ENTRANCE

So what about that most arduous of tasks – getting the data in. I assumed that *Order* would have at least a default input screen. There is nothing of the sort. If you want to put something into *Order* you have to create a data entry screen first.

There's a choice between Fixed or Scroll format, but the 'Scroll' (one record to a line) option is limited to 80 characters stretched across the page. This is therefore unsuitable for most applications, since you can't alter the displayed field width and it doesn't scroll vertically. 'Fixed' format (one record to a page) is better – but not by much. In either case, it is quite possible to paint one field over another without *Order* batting a computerised eyelid. There's something else worth mentioning here too: although it is possible to alter the field names, it is not possible to add text to the form, save a short header.

CLOSE RELATIONS

If there's one thing you need in any relational database system, it's indexes. It doesn't really matter for most jobs whether the indexes are 'unique' or 'common', but they are essential to the workings of the thing. *Order* does not provide facilities to generate indexes – instead it does the work internally (or at least it appears to). This is limiting, as it removes the option to perform a key search on a field: something I consider essential in any professional database.

So how does South Hams get away with describing *Order* as a relational database? It works like this: every form you create can have up to three 'levels', organised as a top-down tree. Records in the form on the second level can be relationally-linked (or 'related') to the records on the first; records in the third level can be related to records in the second. The key (or 'linked') field is determined in the form definition so that remains constant and unchangeable.

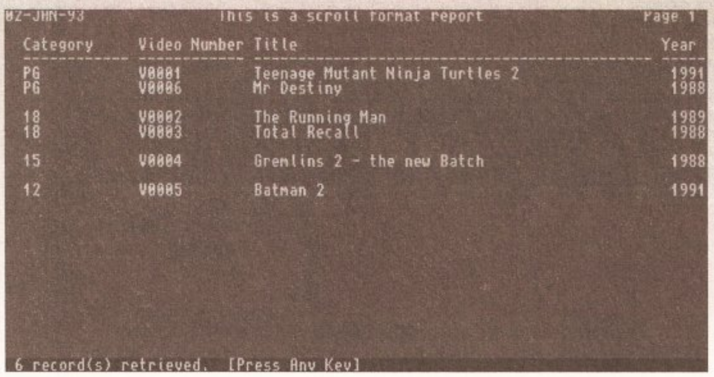
To make all this a little clearer, let's consider the following (somewhat contrived) example:

Take three databases for a project on video. The first (parent) database contains the main video data: title, running time, classification categories, and so on. The second database – level two – contains a short explanation of the classification letters (U: Universal) and the third – level three – a longhand description (Universal: Suitable for all). All three levels are linked by this common field – a film classification letter.

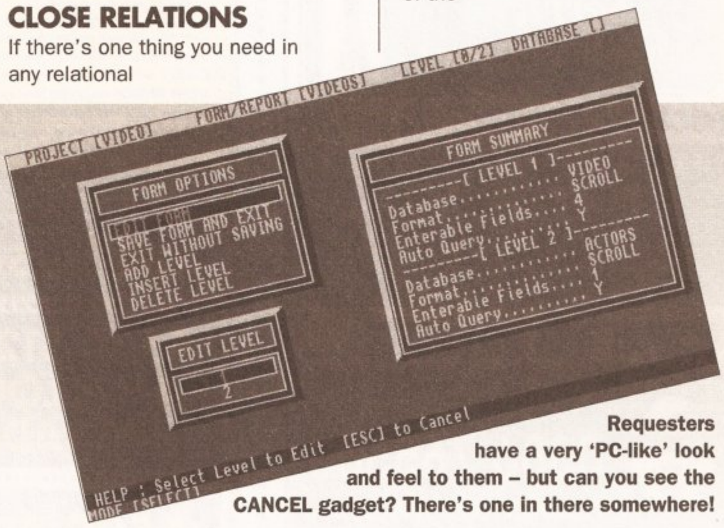
This is called a 'Many-to-One' relationship, in which many records (films, in this case) access one record in the detailed database. Reversing this gives you a 'One-to-Many' relationship. By arranging the form so that level one is the film classification, level two could list all the films with that classification. So, you could select all the films in a collection that are certified 'PG'. (Of course, these examples would work as well with two levels, as the data in levels two and three is constant.)

In this area *Order* does score a point over *Superbase Personal,*

continued on page 102



Reports can break a defined number of lines according to the sort key



Requesters have a very 'PC-like' look and feel to them – but can you see the CANCEL gadget? There's one in there somewhere!

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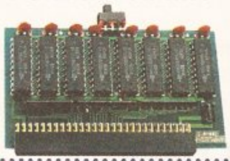
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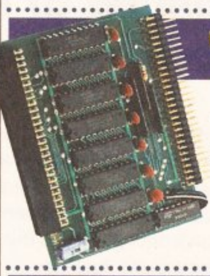
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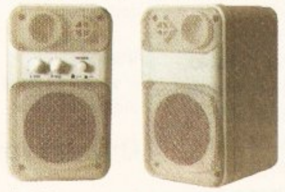
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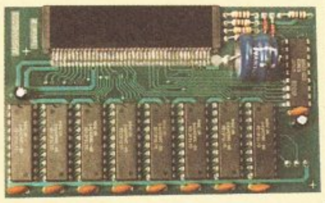
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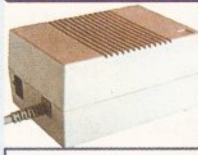
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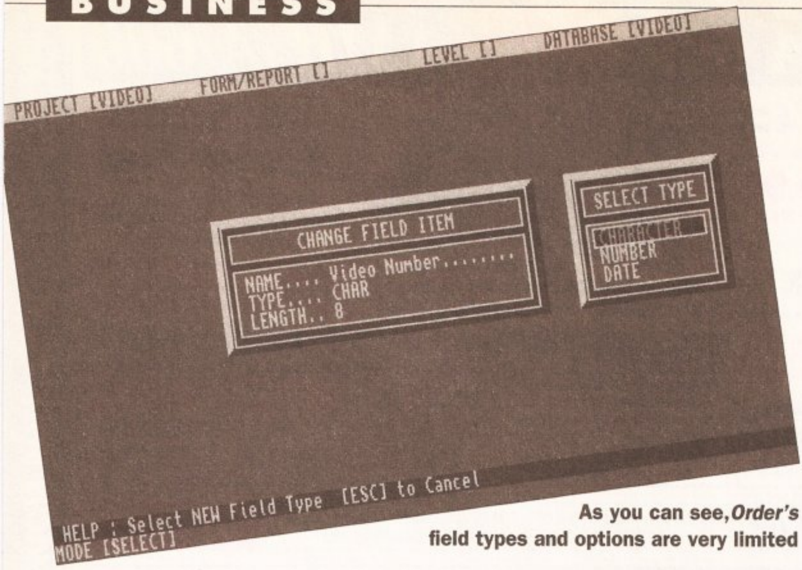
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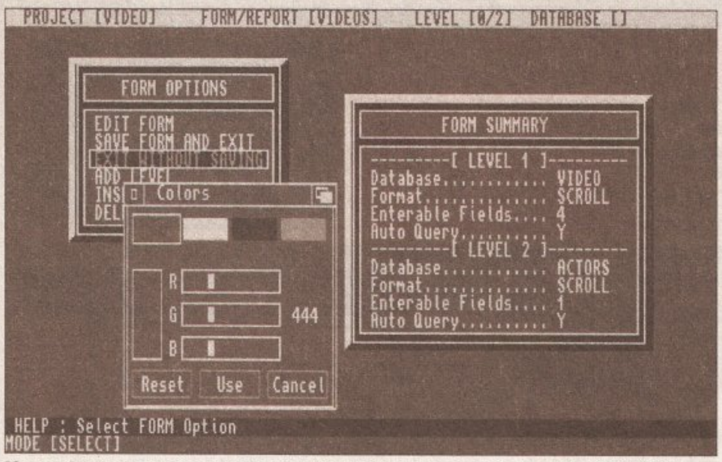
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As you can see, *Order's* field types and options are very limited

CHANGING THOSE COLOURS



If you don't like the palette provided, you can change it using COLORS

Many applications have a feature which allows users to change the screen colours (or 'palette') to suit their own needs.

For applications like *Order*, Commodore provides a simple utility (called 'Colors') so you can change the palette on the front-most screen.

With most applications, all you need to do is drag the application window out of the way, double click 'Colors' and pull the screen back into view. Colors opens a small window to set the current display colours, although these cannot be saved.

WHERE THERE'S A WILL

Order makes things harder than usual, because it prevents normal WIMP access to the Workbench screen. However, where there's a will, there's a way. There are two ways around this problem. The more permanent method is to create a script which can be executed from an icon, and I'll cover that in a minute. The quick and dirty method is to use AmigaDOS, like this:

```
1>RUN WAIT 2 SECS +
COLORS
```

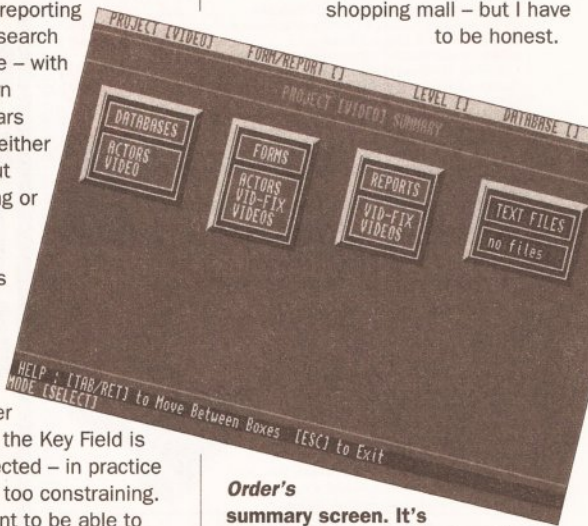
You will need to open a Shell window first, and you may need to adjust the delay time slightly too – this gives you just over two seconds to move *Order's* screen back to the front of the current display. Fast typists can reduce the delay, beginners may need to lengthen it. A more permanent method is to save the command as a 'script' file.

To do this, just enter the two lines above into your favourite text editor and save it on your Workbench disk. If your preferred application can create icons, make sure this option is turned 'on' – otherwise you will need to create an icon for the file yourself. Note that the icon's type must be PROJECT. Change the icon's DEFAULT TOOL to C:ICONX and save it. All you have to do now is double-click the icon and, hey presto, you get a short delay before Colors starts – giving you more than enough time to arrange the screens to your satisfaction.

continued from page 99

because relationships can be accessed at edit-time and not just during reporting. Also, as far as beginners are concerned, it is a lot simpler to get to grips with. This, however, is not enough to give *Order* a big advantage over its competitor.

The question remains: how do you recover data? *Order* has limited reporting facilities, but the search system is primitive – with only limited pattern matching. It appears that South Hams either did not know about input key searching or did not bother to implement it. The nearest *Order* gets to a key search is when a query is requested from an input screen attached at a lower level. In this case the Key Field is automatically selected – in practice though, this is far too constraining.



***Order's* summary screen. It's nice, but what exactly does it do?**

However, I want to be able to create my own indexes – and set them up the way I want to. If *Order* does index files then it's very shy to say how – although tests prove that the program does not support either unique or complex indexes. Anyway, why isn't it possible to have some basic mathematics functions or to paint extra text on report screens – things I would expect to find in all but the most basic of databases? My wish list for *Order* is extensive – but I am not here to tell South Hams how to do its job, but instead to tell you what it got right and, more importantly, what it didn't.

Reporting facilities are important in any database – even if you can't get the odd record up on screen, it is important to be able to design a report where some or all of the records are output according to a set of criteria. *Order* supplies a basic reporting facility similar to the rather cludgy Form editor. Some useful additions have been made here: for instance it is possible to break on sort fields. This is similar to the GROUP function in *Superbase Personal* queries, but here too, *Order* has the edge on ease of use.

CONCLUSION

Order is a nice idea, poorly implemented. Perhaps my opinion is tarnished by a mind spoilt by *Superbase* – but like it or not, *Superbase* remains the only reliable, graphical relational database for the Amiga. No application should place unnecessary restraints on the user, and *Order's* true 14-field limit is a serious limitation – such things are programmed hindrances that never should see a public release.

The manufacturer promises more, but in its present form, *Order* is far too limited.

In summing up I should add that I hate to make adverse comments, and writing a review such as this brings me little pleasure. I am not some sadistic theatre critic who would like to see the West End demolished to make way for a new shopping mall – but I have to be honest.

A lot could be done to improve *Order*, although much of that would require a ground-level re-write and I doubt that South Hams Software has the manpower to do it. Go on guys, prove me wrong. AS

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Order 2.03 ....£29.95
By: South Hams Software, Rose Cottage, Ford Road, Torre, Yealmpton
Plymouth
South Hams PL8 2NA
☎ 0752 880906

CHECKOUT ORDER 2.03

Flexibility ●○○○○
A foot-thick steel girder comes to mind...

Power ●●○○○
Records only limited by disk space but little else.

Ease of use ●●○○○
But it isn't powerful enough to be complicated!

Value ●○○○○
It's just not good enough to justify the outlay.

Overall rating ●○○○○

South Hams Software must try harder.

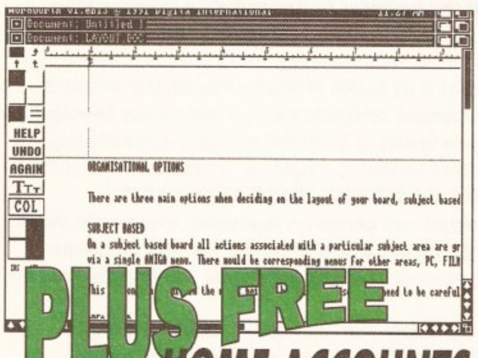
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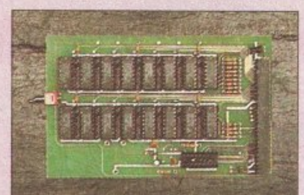
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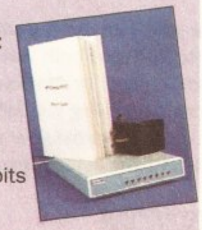


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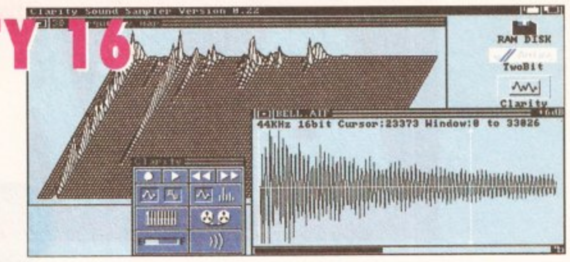
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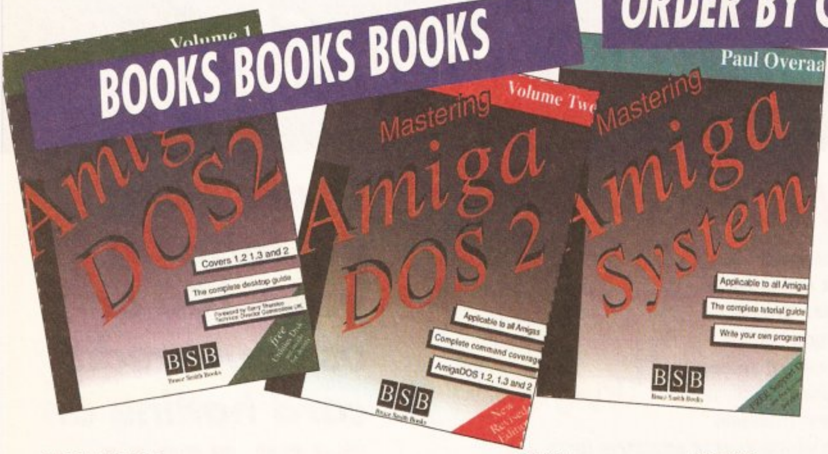


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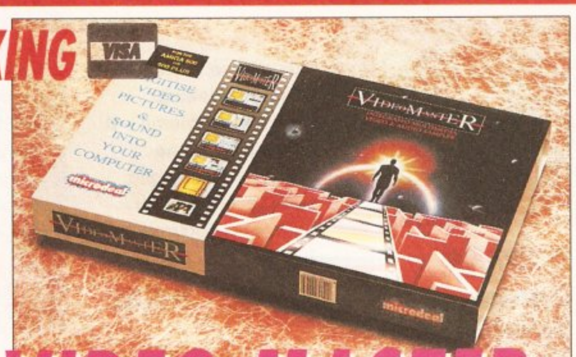
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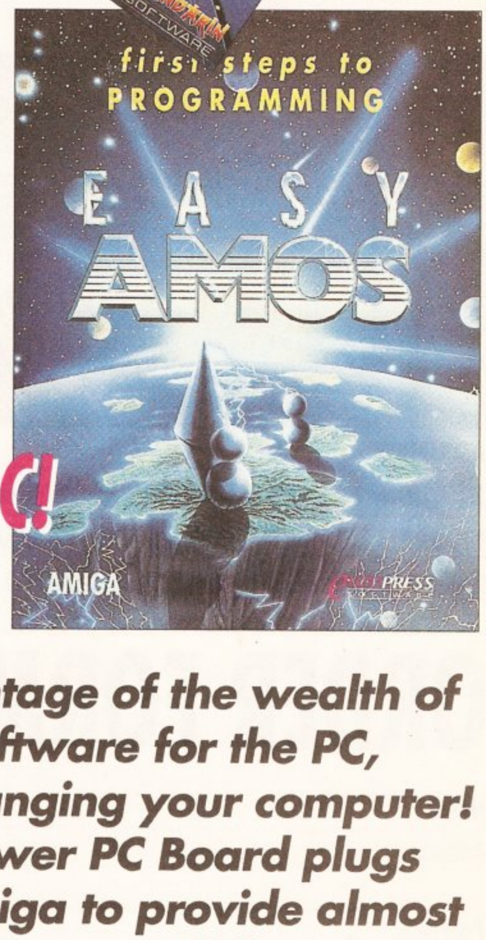
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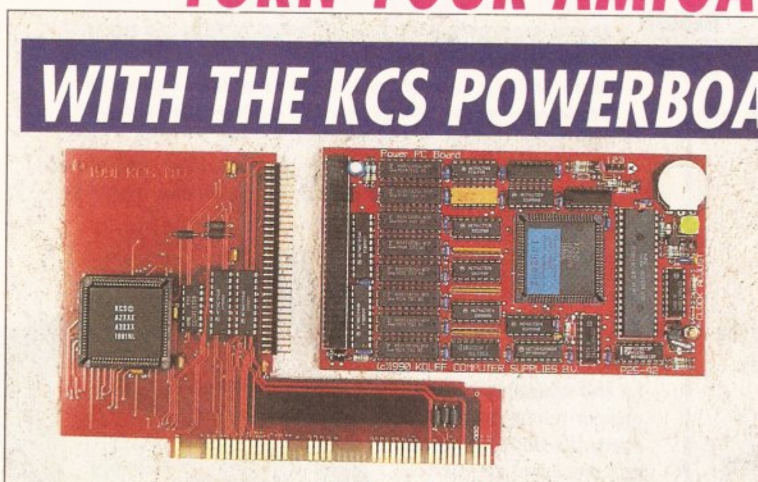


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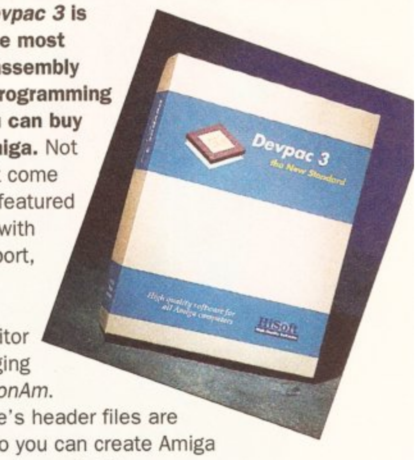
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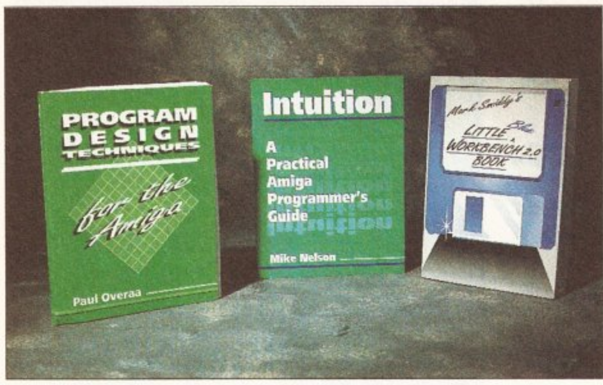
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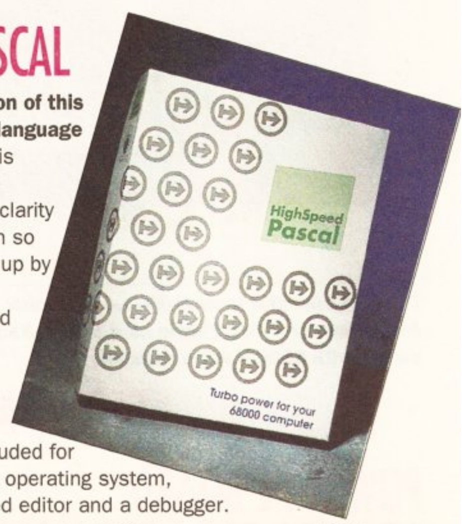
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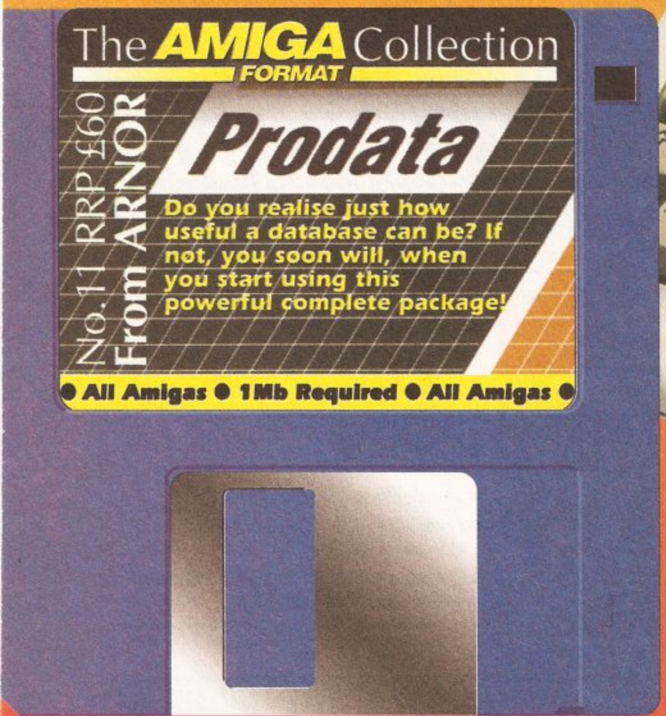
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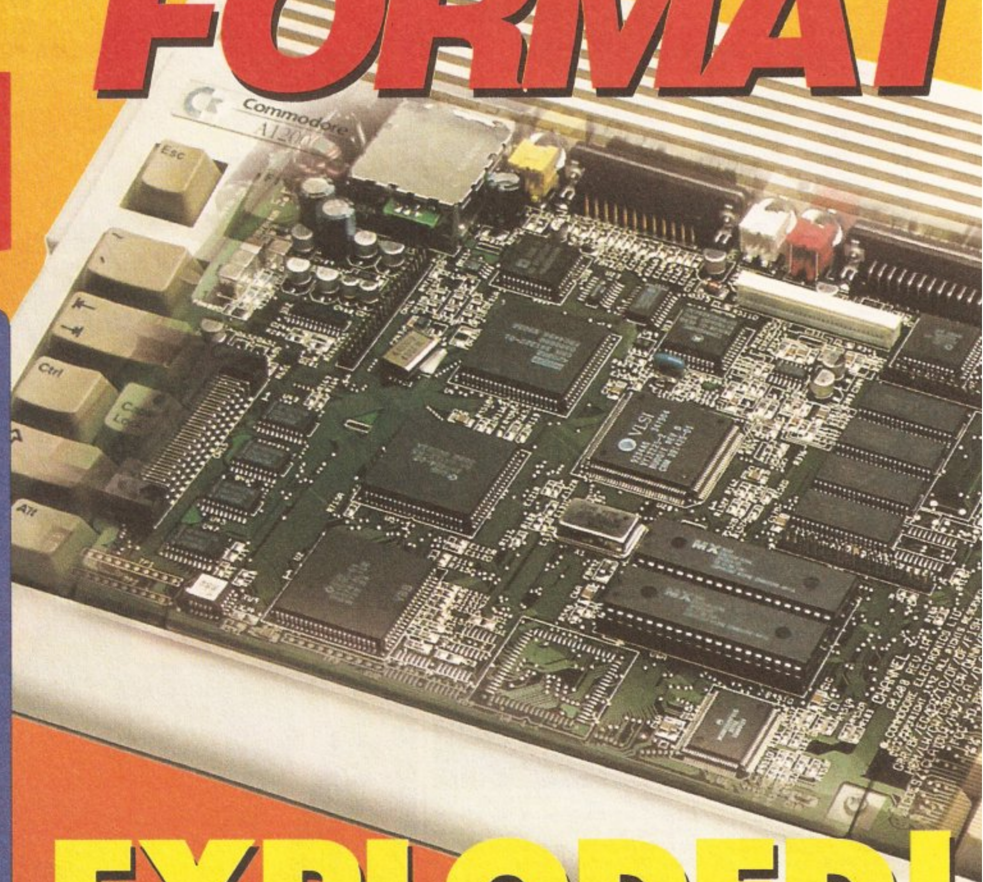
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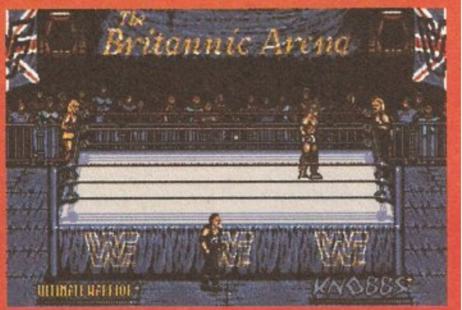


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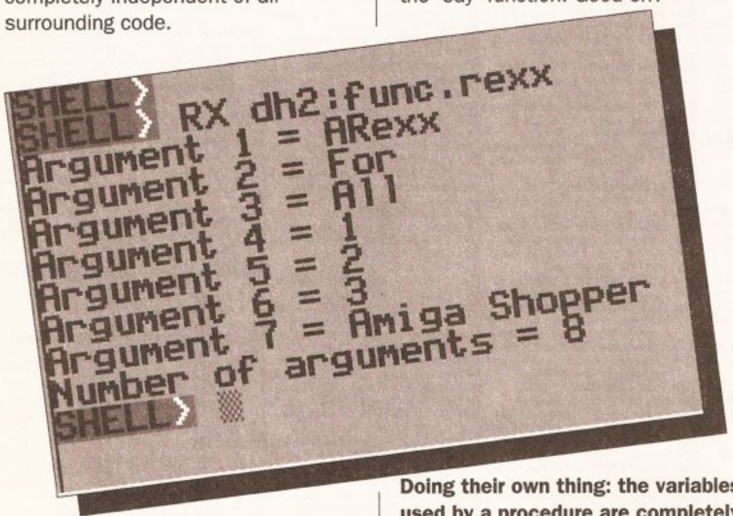
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Sometimes it's worth taking stock and counting your blessings. There's no denying that ARexx provides us with a comprehensive selection of built-in functions that allow us to perform all sorts of jiggery-pokery in our ARexx scripts. There are functions to format strings, read and write characters from files and much more besides. But while the selection of functions on offer is pretty comprehensive (especially when compared to lesser languages!), you may eventually feel that some extra functions would have been nice.

So what do you do when this happens? It may not be too much of a problem if you only ever intend to use the function that you need once, but wouldn't it be great to be able to add extra functions to the ARexx command set? Well, you can achieve this, simply by defining your own. What's more, user-definable functions can be written in such a way that they can be used over and over again. And as an added bonus, ARexx also provides direct support for powerful 'Procedures', which are completely independent of all surrounding code.



Doing their own thing: the variables used by a procedure are completely independent of the main script

STARTING SMALL

Anyway, let's start by taking a look at a very simple function. All this function does is to pass the value '12' back to a variable called 'number'. Here's the code in all it's glory – type it in and run it to see the code working:

```
/* Function demo 1 */

number = myfunction()
say number
exit

myfunction:
    return 12
```

Sure, it's hardly very exciting, but it does serve as a perfect example of ARexx functions in action. The important ingredients here are the label name (in this case, 'myfunction:') and the 'return' instruction. The label marks the position of the user function within the script and also tells ARexx that all the code that follows the label belongs to a function. The end of the function is defined by the 'return' instruction, which can also be used to pass a value back to the piece of code that called the function.

In the case of our example program here, the value passed back by the 'return' instruction is automatically stored in an ARexx variable called 'number'. This is achieved using the instruction 'number = myfunction()'. This not only calls the function called 'myfunction()', but also tells ARexx that any values passed back by that function are to be stored in a variable called 'number'. If this were to be omitted, the function would be pretty useless.

You could, however, automatically display the value returned by the function using a line such as 'say myfunction()'. Then, because two functions have been combined, the value returned by 'myfunction()' would be passed to the 'say' function. Good eh?

ARexx functions do have one slight peculiarity that you need to know about. Unless you specifically tell ARexx otherwise, it will automatically expect your function to return a value. If it doesn't (if, for instance, the function ends with just 'return') then ARexx will display an error message.

To get around this, you can call such a function using the ARexx 'call' command. The call instruction doesn't actually do very much – its role in life is to tell ARexx that the function which is being called will not return a value. Here's a demonstration of this in action:

```
/* Function demo 2 */

call myfunction()
exit

myfunction:
    say "Hello there!"
    return
```

ARGONAUTS AHOY!

So far we've hardly produced anything worth writing home about, so let's take a look at a more advanced user function – such as the one shown in Listing 1. This one uses the 'arg()' function (as discussed in last month's column) to pass values to a user function.

To be perfectly honest, there's very little difference between this function and the first function that we discussed. The only real difference is that we're passing values to the function by enclosing them within brackets when the function is first called. In this particular demonstration, we've passed three different types of parameters – strings ("ARexx", for example), numbers (1,2,3) and even the variable 'as' that we defined at the start of the script.

In fact, though, we don't technically need to pass parameters to a function and then use arg() to read them. Although this makes our code considerably tidier and easier to read, ARexx functions have one big disadvantage that makes them somewhat less useful than they might have been. Because the function is treated as simply an extension of the main program, all variables are what are called 'global' rather than 'local'. That is to say, any variable defined within a function can be addressed from within either another function, or indeed the main program itself.

> **"Procedures... are completely independent of all surrounding code"**

Although this isn't too much of a problem when the function is only being used within a single script, it could create problems if you were to use the same function over and over again within different scripts. Say, for example, you wrote a script that held a customer's name in a variable called 'cn'. If this variable was also used by the function for another purpose, the value originally stored in 'cn' would be overwritten.

The answer to this problem lies in ARexx's powerful 'Procedures' facility. Procedures offer the same neatness of code that functions give, but, as far as we are concerned, their big advantage is that any variables defined within a procedure remain completely independent of the rest of your code. To demonstrate procedures in action, let's recode the last example program so that a procedure is used instead of a function. The resulting script appears in Listing 2.

RECOMMENDED PROCEDURES

So what's the difference? After all, they both look the same (apart from the obvious name change). Look closely, though, and you'll notice the addition of the 'procedure' instruction next to the function label. Obviously it isn't a function label anymore – because we added the 'procedure' instruction, the label now defines a procedure. As you can see, apart from this addition, very little else has changed.

The only real problem with this example is that it doesn't really demonstrate how variables used by a procedure are independent of the main program (and vice versa). Let's take a look at another example that serves these purposes better:

```
/* Procedure Demo 2 */
```



BOOKS FOR BOFFINS

Several of you have written to me asking whether any good books on ARexx programming are available. Although this column is designed to teach you everything you need to know about ARexx, I do realise that there are those among you who would like to take our ARexx tutorials that bit further.

Unfortunately, ARexx isn't yet supported with many decent reference books. At the time of writing, the only ARexx book available is Abacus' brilliant *Using ARexx On The Amiga* written by Nick Sullivan and Chris Zamara, two of Abacus' most prolific authors. I've never really been a fan of Abacus publications, but this is one book that no self respecting ARexx coder should be

AREXX FOR ALL

It's do-it-yourself time! Jason Holborn explains how writing your own functions and procedures makes your ARexx code much more readable

```
var1 = "Amiga Shopper"
var2 = "ARexx For All"

call myproc()

say "VAR1=" var1 "VAR2=" var2

exit

myproc: procedure
```

without. Not only does it cover the ARexx command set, but it also provides very good coverage of some of the more major applications that support ARexx. It's available from most good bookstores.

Still in the pipeline is *Amiga Shopper* contributor Paul Overaa's new ARexx tome, which is to be published by Bruce Smith Books. Entitled *Mastering Amiga ARexx*, the book claims to offer pretty much the same sort of coverage as the Abacus book, but with more up to date information on ARexx-compatible applications. Rest assured that as soon as it is released, I'll be bringing you a full review within these pages.

```
    var1 = "Every month"
    var2 = "AMOS Action"

    say "VAR1=" var1 "VAR2=" ↵
var2
    return
```

(Don't type the '↵' symbol – it's just there to show where the command goes onto the next line). As you can see from the code above, the script starts by defining two ARexx variables – 'var1' and 'var2' – and the strings 'Amiga Shopper' and 'ARexx For All' are written into them. The script then transfers control to our procedure 'myfunction' which then creates its own variables using exactly the same names. These are then displayed and the procedure passes control back to the main program. Then, just to prove that the original var1 and var2 haven't been affected by the procedure defining its own versions of these two variables, their contents are then displayed on screen. If all went well, you should see something like this appear:

```
VAR1= Every month VAR2= AMOS Action
VAR1= Amiga Shopper VAR2= ARexx For All
```

However, there is a catch – procedures do create another problem. Say, for example, that you did want a variable to be shared between a procedure and the section of code that called it. At the moment, the only way to do this would be to pass the variable to the procedure using 'arg()', and then pass it back using the 'return' instruction. Although this would do the job, it's a lot of hassle. But the good news is that there is a way of getting around this limitation – by means of ARexx's 'expose' instruction.

THE CORRECT EXPOSURE

'Expose' is basically the ARexx equivalent of *AmigaBASIC's* 'SHARED' instruction and *AMOS'* 'GLOBAL' instruction. What it does is tell ARexx that certain variables are to be treated as 'global' variables. That is, they can be addressed by both the main program and the procedure that you're interested in. In time-honoured tradition, let's take a look at another example script that makes use of this feature:

```
/* Expose demo */

var1 = "Amiga Shopper"

call myproc()

say "VAR1=" var1
exit

myproc: procedure expose var1
    var1 = "Every month"
    return
```

As you can see from this script, the 'expose' instruction is placed after the 'procedure' definition, followed by the name of the variable that we wish to get at. Although we're only exposing a single variable in this particular example, there's no reason why you couldn't expose a whole list of different ones. To demonstrate that the variable has indeed been exposed, the script starts by storing 'Amiga Shopper' into the variable 'var1'. The procedure 'myproc()' is then called. All this does is change the value stored to 'Every month'. The procedure then passes control back to the main program and the value of var1 is displayed. If we hadn't defined var1 as a global variable, then it would still contain 'Amiga Shopper' but, because it is now global, changing its value within the procedure results in 'Every month' being displayed.

Well, that's about it for procedures and functions. As you can see, they're actually very simple to use. Despite this simplicity, they're one of the most powerful aspects of the ARexx command set. If you want to make your ARexx code as readable as you can, then try to use them as much as possible. If you do, you'll know that your ARexx scripts will be considerably easier to amend at a later date, should the need arise. AS

NEXT MONTH • NEXT MONTH

We've covered a substantial amount of ground over the last few months of *ARexx For All*. Next month we'll be diving head-first into the subject of string manipulation within ARexx. With these functions under our belts, we'll be ready to start playing around with disk-based files. See you then!

LISTING 1 • LISTING 1 • LISTING 1

```
/* Function demo 3 */

as = "Amiga Shopper"
numargs = myfunction("ARexx","For","All",1,2,3,as)
say "Number of arguments =" numargs
exit

myfunction:
   numargs = arg()

   do count = 1 to numargs
        say "Argument" count "=" arg(count)
        end
   return count
```

LISTING 2 • LISTING 2 • LISTING 2

```
/* Procedure demo 1 */

as = "Amiga Shopper"
numargs = myproc("ARexx","For","All",1,2,3,as)
say "Number of arguments =" numargs
exit

myproc: procedure
   numargs = arg()

   do count = 1 to numargs
      say "Argument" count "=" arg(count)
      end
   return count
```

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Sailing through C

Our series of programming tutorials continues with a look at how C uses strings, arrays and functions. Toby Simpson is here to give you a few pointers

Last month we discussed arrays and strings, and discovered that a string is actually an array of characters with a zero at the end. This time around, we're going to talk about the most difficult concept used for programming in C – the pointer.

This will let us start to use Amiga-specific functions for slightly more interesting tasks than just printing strings on the screen!

So, what is a pointer? Well, its name gives it away. A 'pointer' in C is something that points to something else. Just as we can have variables that are integers, characters or other goodies, we can also have variables that are pointers. Lost yet? Let's use a small example to explain what is going on here:

```
int *age;
```

You should recognise this as a declaration for the integer variable **age**. The asterisk (or 'star' character) means that rather than **age** holding an integer value, it actually holds a pointer to where an integer value is stored. In computing terms, it holds the address of a memory location. Let's try another example:

```
#include <string.h>
#include <stdio.h>

void main(void)
{
   char full_name[128];
   char *pointer_to_name;

   pointer_to_name = ↵
&full_name[0];

   *pointer_to_name = 'a';
   pointer_to_name++;
   *pointer_to_name = 0;

   printf("String was: ↵
'%s'\n", full_name);
}
```

This looks quite complicated, so don't worry if you're not quite sure what's going on yet. First, let's examine the variable declarations at the start. Initially, we have declared an array of up to 128 characters in the same way as we did last month, ready to put a string of some sort into it. Underneath, we have created the variable **pointer_to_name**, which is a "pointer to a variable of type char". The next line introduces a new operator, the 'ampersand', which looks like this: '&'. You should read this as meaning "the address of." Translating this line into English gives us something like:

"**pointer_to_name** becomes the address of the first element in the **full_name** array of characters".

Following all this so far? Good, it doesn't get much worse – honest. If you're not too sure about it, read the above paragraph once more, and perhaps try typing in the program. We have now obtained the actual memory address of the first character in **full_name**.

So, if we convert the line after that into English, we get:

"put the character 'a' into the address held in **pointer_to_name**".

This writes the character 'a' into the address held in our pointer. The line after that uses post increment to add one to the address, with the result that **Pointer_to_name** now points to (or, in other words, stores the address of) **full_name[1]**. We then write a zero into this new address. So, all this code has the same effect as the single line:

```
char full_name[128] = "a";
```

You might wonder why on earth we've gone to so much trouble over something that is as obviously straightforward as putting the string "a" into a character array. Well, pointers are one of C's most powerful features, as we shall soon see. But, on the other hand, it is astonishingly easy to get very muddled up when using them – unless you're entirely clear about how they work. Once you have set up a pointer, the computer is unable to tell you if you are adding silly values to it, or if you have not set it up correctly. This makes it all too easy to write into the wrong part of memory, causing crashes which are very difficult to track down. If you're still not sure about pointers, then do read the above section again. Otherwise you may well go prematurely bald, after pulling all your hair out while looking for elusive pointer programming bugs.

Just about everything in C relies on pointers. For instance, let's write a small program that returns the length of a string. All you have to do is pass it a pointer to one:

```
#include <stdio.h>

int strlen(char *string);

void main(void)
{
   char test[128] = "Hello ↵
world";

   printf("%ld\n", ↵
strlen(&test[1]));
}

int strlen(char *string)
```

JARGON BUSTERS • J

GUI – Graphical User Interface. This is what you actually see on your screen when you are using your Amiga. On the IBM PCs and compatibles, the GUI is Microsoft Windows. On the Amiga the GUI used is called Intuition.

Gadget – On the Amiga, this is something you click on to do something, such as a button, or a box to enter a number or a string, or a check-box for example.

Pointer – In C a pointer is a

LISTING 1 • LISTING 1

```
/* Program to flash workbench screen */

#include <stdio.h>

#include <exec/types.h>
#include <exec/exec.h>
#include <intuition/intuition.h>

#include <clib/exec_protos.h>
#include <clib/intuition_protos.h>

struct Library *IntuitionBase;   /* pointer to
intuition.library */

void main(void)
{
   /* Open the intuition Library, and find its address */
   IntuitionBase = OpenLibrary("intuition.library", 33);

   if (IntuitionBase == 0)
      {
      /* Result was zero, so it failed to open */
      printf("Error: Couldn't open Intuition Library\n");
      /* Quit */
      return;
      }

   DisplayBeep(NULL);

   CloseLibrary(IntuitionBase);
}
```

```
{
    int length;

    length = 0;
    while(*string++ != '\0') ↵
length++;

    return length;
}
```

So, how does all this work? First, we have our main program which simply creates a string called **test.** This contains that world-famous pair of words: "Hello world". We then call our **strlen** function with "the address of the second character in the string **test**". This is obtained using **&test[1]** – remember that arrays are always numbered from zero. So, this will be a pointer to the 'e' of "Hello world" rather than the 'H'.

Our function **strlen** takes one parameter, and that is a pointer to characters. In this routine, we clear a counter (**length**), and while "the character held in the pointer called **string** is not zero, add one to **length**. At the same time, also increment the pointer each time to point to the next character." Put like this it's not so hard after all! Finally, we return the contents of the **length** variable.

You may be wondering what the instruction just before the **void main(void)** line is. Well, this is a 'function prototype'. It tells the compiler what parameters our function takes, and thus allows it to check to see if we're calling it properly. If we pass it the wrong sort of value, it will point this out as a warning when we are compiling.

In reality we never have to write routines as simple as **strlen**, as they are already provided for us, along with all sorts of other handy functions for dealing with strings. **Strlen** was used to show that pointers are both useful and versatile. A considerable quantity of the Amiga operating system calls take pointers to one thing or another.

So, now that we're familiar with the basic idea of pointers, we're ready to put some of this learning into action and write a listing that actually does something impressive. In fact, it's going to be a big program that does next to nothing, but, once again, it'll be great for showing how things work.

VISITING THE LIBRARY

At the risk of adding to the (hopefully mild) confusion so far, let's talk about 'Libraries' for a while – and I don't mean the ones with books in them. The Amiga has an advanced 'pre-emptive multi-tasking operating system' built in, but you knew that already of course! If your Amiga has Workbench 2 or 3, you have 512K of ROM inside your Amiga, a whole half-Megabyte storing the Kickstart. This Kickstart ROM contains all of the routines and programs that make your Amiga work: the Workbench, the windows, screens, disk drive drivers, and so on. All of these routines are grouped into functional blocks called 'Libraries' or 'Devices', and given names. This gets much more complicated very rapidly, so rather than getting bogged down in details, we'll use a quick example to explain the concept better. We'll pick on one particular library, the Intuition library. This is responsible for the Amiga GUI, which is what you see on the screen when you use Workbench. Intuition controls all of the Amiga's windows, screens, gadgets and much more.

> "...pointers are one of C's most powerful features, as we shall see."

In order to use the library, we first have to 'open' it. Because of the multi-tasking nature of the Amiga, we have to ask before we can use Intuition. The operating system tells us if it is available, and if so, where it is. This then enables us to call its routines. When we have finished using the library, we must close it. The opening and closing routines can be found in the **exec.library**.

"Aha!", you will probably exclaim at this point, if you've been following everything carefully so far. "Toby's caught himself out this time – how can you use a routine in the **exec.library** to open a library, as that would mean there was no way of opening the **exec.library** in the first place?" Well, it's a good question, but the answer is simple: the **exec.library** is always open, and you can always call routines from it.

FLASH OF INSPIRATION

In our next example we're going to use two libraries, in order to call one simple routine in the **intuition.library** that flashes the Workbench screen. We're going to expand this program later, so it's a good idea to type it in. The full program appears in the box marked 'Listing 1'.

Now, some of this may look unfamiliar to you, but don't worry – all will be explained. For a start, we've included lots of strange files. In fact, what we've done here is included the definitions for the **exec.library** and **intuition.library**, and also the prototypes for all of the functions in them. You should recall what a prototype is from our **strlen** example above. It ensures that the C compiler knows about all of the routines we are about to call. Another stranger to us is the program line:

```
struct Library ↵
*IntuitionBase;
```

By now, you should recognise the * symbol as meaning 'pointer'. **Struct**, however, is a new one which will be dealt with in more detail in next month's tutorial. For now, I'll provide a brief explanation, as it's not too important just yet. **Struct** is a structure. You can think of it in simple terms as an array, but each element could be a different type. For example, a structure might contain several INTs, some CHARs, some pointers perhaps, and so on. One such structure is called a 'Library structure', and it is defined in the **exec.h** include file. When we call **OpenLibrary**, it returns a pointer to a Library structure which belongs to Intuition. By storing this information, we are then able to use the library. The compiler will ensure that every time we call an Intuition routine, that this number is quoted. If you like, it's our access card – without it we can't get to anything useful in Intuition.

The first thing we do in Listing 1 is to open the Intuition library. The routine **OpenLibrary** is in the **exec.library**, and takes two parameters. One is a pointer to a null-terminated string which is the name of the library we wish to use. The other is the minimum version of this library which we are able to use. This is quite important if, for instance, you are going to use Workbench 2 functions – you will have to ensure your program will stop gracefully on a Workbench 1.3 machine without crashing when it tries to use a routine that does not exist. We are using version 33, which is Workbench 1.2, as nothing we are doing requires anything higher.

Assuming that the required version of the library is available, it will then be opened. If, for some reason, it did not open (due to a mis-spelt name, wrong version, library not available, or whatever) then **OpenLibrary** will return a zero. We then test for this and quit the program if it failed.

Otherwise, we call the **intuition.library** routine **DisplayBeep**, which flashes a screen. You pass it a pointer to the screen you wish to flash, or zero ('null') to flash the default screen (in most cases, this is the Workbench screen). Having done this, we close the library and quit.

If you have the *Libraries* RKM, or better still, the *Includes and Autodocs* one, it's worth looking up the **DisplayBeep** function to see what they say about it.

LOOKING FORWARD

It's got a bit complicated this month, and we've introduced lots of new things to learn. Next month we'll take a little step backwards, and discuss structures, pointers and functions in more detail. This will help us call more powerful functions in the **intuition.library** and help us towards the eventual goal of opening a window with some control buttons on it. In the meanwhile, have a play around with string pointers! AS

This month's C listings are on the cover disk – see page 22 for details!

BUSTERS • JARGON BUSTERS • JARGON BUSTERS • JARGON BUSTERS

variable type which points to something in memory.

Pre-emptive – The Amiga has a pre-emptive multi-tasking operating system. To explain briefly: there is an overall system controller program (called the 'executive') which gives each program running a fair chunk of available processing time depending on its priority. It's called pre-emptive because the executive will stop the currently running task without asking it and pass control to the next. This results in smooth multi-tasking.

Co-operative – This is a different, and far inferior way of multi-tasking. Microsoft Windows operates in this way, as does Risc-OS on the Acorn Archimedes. With co-operative multi-tasking each program has to say "I've finished for now" before the next one can get some time. The result of this is that if any individual program takes more time than it needs, or fails to say that it's finished, all of the other tasks stop. The Amiga does not suffer this burden because it uses a different form of multi-tasking.

RKM – Rom Kernel Manual. The RKMs are the official Commodore reference manuals, describing every routine inside the Amiga. There are six books; *Libraries, Devices, Includes and Autodocs, Style Guide, Hardware Reference Manual* and finally the *DOS Reference Manual.*

Find your local group

If your group isn't mentioned, fill in the form at the bottom of the page to let us know about you

1520 Plotter Group (ICPUG) John Bentley ☎ 06286 65932

16-32 Micro Programming AMOS, bimonthly fanzine, PD, (Fish->590) Membership 100FF or £10. For more information contact F Moreau, 132 rue Jean Follain, 50000 Saint-Lo, France ☎ 31 52 20 02

Action Replay Users Club For help, tips, lists of pokes. Free. For more details contact Gordon Hagan, 66 Muirside Avenue, Kirkintilloch, Glasgow G66 3PR

Allbit Computer Club General hints and tips, advice, competitions, draws, shop. Entrance fee £1.50. Contact Mick, 170 Claughton Ave, Crewe, Cheshire CW2 6ET

Amiga Addicts Newsletter and open nights For info SAE to A Minnock, Clonkelly, Binn, Co Offaly, Ireland

Amiga Artists Club 34 Roundhay Mount, Leeds LS8 4DW. For Amiga artists, musicians and coders. Pirates not welcome. Free. ☎ Kam on 0532 493942, 5-8pm

Amiga Athens club PD swaps, tips, cheats etc. Free membership, just new PD or tips in exchange for our services. Contact Stefanos Papamichael, 9 Derfeld Rd, Patisia, 11144 Athens, Greece. ☎ 01/2027973

AmigaBASIC club Free bi-monthly disk, help for beginners and experts. Membership £10 per year. Contact Conran Ahmad, 15 Weybridge Rd, Thornton Heath, Surrey CR7 7LN ☎ 081 689 9102

Amiga Beginners' Club 110 Whitehill Park, Limavidy, Co. Londonderry BT49 0QG. Club to help newcomers. Bi-monthly club disk, and a small PD library. Membership £2 for a single disk, or £20 for every issue

Amiga Graphics Club I want to set one up! But to do so, I need your help, If enough of you reply, your graphics can only benefit. For details you should write to Jonathan McBrien, 16 Drumbawn, Enniskillen, Fermangh BT74 6NF

Amiga Helpline Contact Gordon Keenan, 21 Skirsa Place, Glasgow G23 5EE. Software/hardware help service, free PD, DTP problems sorted, plus general Amiga chit-chat. Send a stamp for full details. Membership £15 per year

Amiga Mania Bi-monthly publication (28+ pages). Public domain, licenseware, bargains, classifieds, free advice, free gifts, free disks. Annual membership £12. Contact D Cryer, 88 Blackbull Rd, Folkestone, Kent CT19 5QX

Amiga Maniacs Help Graphics, sound, Workbench, programming, help on any topic. Beginners welcome. Free membership (by post). Contact Johnny, 8 Tan-y-Grais, Caernarfon Rd, Bangor LL57 4SD

Amiga Musicians Club Membership gets you a disk with 50 IFF samples a month for 12 months. Also sample service. Membership £30. Contact Gavin Wylie, Guthrie Street, Carnoustie, Angus

Amiga Navigation Contact Dave Thomas 4a, Allister St, Neath, W Glamorgan. PD, advice, even small repairs and social evenings. Weds 7 – 9pm. Membership £10 per year

Amiga Network International 2 monthly club disk, reviews, advice. For info contact Phil or Steve: 434 Denby Dale Rd East, Wakefield, W Yorks WF4 3AE

Amiga PD Exchange at 27 Spa Rd, Preston, Lancashire, PR1 8SL. Chance to exchange PD, shareware, Fish and Tbag disks. £1 for disk and membership

Amiga Users Klub, Windsor House, 19 Castle St, Bodmin, Cornwall PL31 2DX. Meets every Friday from 6.30-9pm, to expand members' knowledge of Amiga and to help solve people's problems. Contact Jack Talling

Amiga User Group – Fylde Contact Andy Wilkinson ☎ 0253 724607 25 Glen Eldon Rd, Lytham St Annes, Lancashire FY8 2AX. Meetings twice a month, newsdisk, tuition, technical support, Amiga advice Membership £15 per year

Amiga Users Club Contact Edward Metcalfe ☎ 021 7441430 49 Burman Rd, Shirley, Solihull, W Midlands B90 2BG PD swapping, games swapping (not copying), competitions, free membership

Amiga Video Producers' Group Meets quarterly in Swindon. For info SAE to J Strutton, 8 Rochford Cl, Grange Park, Swindon, Wilts SN5 6AB ☎ 0793 870667

Amiga Witham Users' Group 85 Highfields Rd, Witham, Essex CM8 1LW. Tips and Basic programs. K Anderson ☎ 0376 518271

Amigaholics Club Disk magazine covers PD, programming, music, art, DTP, and more. Free membership. Contact Kevin Bryan, 49 Coutts House, Charlton, London SE7 7AS ☎ 071-580 2000 Ext 240

AmigaSoc PD, tips, cheats, MIDI, programming, disk magazine, all welcome. Free membership. Contact Neil Cartwright, 17 St Winefrides Ave, Manor Park, London E12 6HQ ☎ 018 553 5434

Amigos PD Large PD library – £1 for catalogue disk. For more details contact Roland Arnold, 16 Mayfair Ave, Ilford, Essex IG1 3DL ☎ 081-554 5160

AMOS Programmer Club Free membership, swap AMOS programs and PD, disk magazine and help for new users. Contact Gareth Downes-Powell, 6 Brassey Avenue, Broadstairs, Kent CT10 2DS

AMOS Programmers Exchange Free membership. Swapping software and ideas. Help available. J Lanng, 7 Majestic Rd, Hatch Warren, Basingstoke, Hants RG22 4XD

AMOS Programmers Group John Mullen at 62 Lonssdale St, Workington, Cumbria CA14 2YD. Hints, tips, tutorials too. SAE for info. £10 membership for bi-monthly disk mag

Angus Amiga CDTV club Contact J Robertson, 22a High St, Brechin, Angus DD9 6ER ☎ 0356 623072. Review software, discuss anything Amiga. Free membership

Asia Amiga Association Newsletter, PD, information, advice, ideas, exchanges. Membership HK$250 per annum. For more info contact Pete Alex, Room 11c, Fortune Court, 4–6 Tak Hing St, Kowloon, Hong Kong. ☎ 7245196

Astro PD Send SAE and blank disk for catalogue. Help and advice also available. Contact D Benson, 3 Skiddaw Court, Nunthorpe, Middlesbrough, Cleveland TS7 0RD

Avon Micro Computer Club Graphics and animation, business and the chance to speak to professional users. £3 per annum. Contact Roger: 95 Downend Rd, Horfield, Bristol ☎ 0272 513224

Basic Programmers' Group 68 Queen Elizabeth Dr, Normanton, West Yorks WF6 1JF. Encourages the use of Basic, exchanges ideas and assists beginners to the language. Free newsletter Mark Blackall ☎ 0924 892106

Beaconsfield and District CC Contact Philip Lishman ☎ 0494 782298 27 Russell Court, Chesham, Bucks. Meetings at St Michaels Hall, St Michaels Green, Beaconsfield 7.45 – 9.45pm. Programming, gaming swapping PD, having fun. Membership £10 for 6 months

Bloomfield Video and Computing Beginners, video techniques. Meetings at Bloomfield Community Centre, Narberth, 7.30pm alternate Tuesdays. Membership £5. Contact Mrs Beryl Hughes, Nashville, 50 Glynderi, Carmarthen, Dyfed SA31 2EX ☎ 0267 237522

Bournemouth Amiga Club Problems, fun, social beginners welcome. Free. Contact P Chamberlain, 36 Homeoaks, 30 Wimborne Road, Bournemouth, Dorset BH2 6QA ☎ 0202 296714

BR & CJ Computer Club B Robinson at 23 Fairway Rd, Shepshed, Loughborough, Leicestershire, LE12 9DS ☎ 0392 72889 or 03922 841296. Regular disk mag packed with tips, reviews of games and serious software, game cheats database, demos and utils, very large PD library. Membership fee £1.25

Bus Stop PD from 40 to 75p per disk, cheats, classifieds and gossip, plus competition every 2 weeks. Send SAE and 50p for catalogue. Lisa Tyree, 5 Westbourne Rd, Marsh, Huddersfield HD1 4LQ

Cacophony (Unlimited) Aims to create quality PD with AMOS and others. Help given. Mark Wickson, 49 Perrott Close, North Leigh, Witney, Oxon OX8 6RU

Camberley User Group Lectures, competitions, advice, meetings, free membership. For more info contact F Wellbelove ☎ 0252 871 545

Champion PD Club PD at 30p, newsletters, advice, help and more. Membership £10. Contact Steve Pickett, 31 Somerset Close, Catterick, N Yorkshire, DL9 3HE

Cheapo PD Club Non-profit making postal PD, newsletters, advice. Membership £5. Contact Jason Meachen, Ivy Cottage, Chapel Road, Beaumont, Clacton, Essex CO16 0AR

Chester-le-Street 16-Bit Computer Club Ground floor function suite, The Civic Centre, Newcastle Rd, Chester-le-Street. Meets Mondays from 7.30- 9.30pm. Exchange advice and swap tips. ☎ Peter Mears 091 385 2939

CDTV Users Club Technical support, news, compiling compatible software list. Free membership – just send SAE. Contact Julian Lavanini, 113 Fouracres Rd, Newall Green, Manchester M23 8ES

Chic Computer Club Full details with an SAE to STAMP, Chic Computer Club, PO Box 121, Gerrards Cross, Bucks. For info contact Steve Winter ☎ 0753 884473

Club 68000 Competitions, programming, music. Meets Harrogate Leisure Centre, Mondays 6.15pm-10pm. SAE to Chris Hughes, 59 Walton Park, Pannal, Harrogate, N Yorks, HG3 1EJ ☎ 0423 891910

Club Amiga £10 a year for PD and a 24-hr helpline (091 385 2627). For more info send SAE to Chris Longley, 5 Bowes Lea, Shiney Row, Houghton Le Spring, Tyne and Wear

Club Futura Advice to programmers and beginners. Send SAE for info to G Holland, 16 Hermiston, Monkseaton, Whitley Bay, Tyne & Wear NE25 9AN

Comp-U-Pal Australian group for users in the outback. Newsletter, helpline, PD library. Membership A$24. Comp-U-Pal, c/o MDA, PO Box 29, Knoxfield 3180, Victoria, Australia

Computeque Steve Lalley at Inskip Meeting

GET YOURSELF LISTED

If you run a user group which isn't listed on this page, fill in the form below for your free entry. Send it to *Amiga Shopper* User Groups List, 30 Monmouth Street, Bath BA1 2BW. We reserve the right to refuse entries.

AS23

Group name ....

Contact name ....

Contact telephone number ....

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Place of meetings ....

Time of meetings ....

Type of activities ....

....

Membership fee ....

Hall, Ashurst, Skelmersdale, Lancs on 0695 31378 7.45pm – 10.30 pm every Tuesday. From beginner to advanced user. Half year membership £2.50 children, £3 adults

Computer Club 16 Laton Rd, Hastings, East Sussex ☎ 0424 421480. A 16-bit club dedicated to being computer enthusiasts Membership costs £15 per year

Darlington Commodore Users Club News, discounts, cheap PD, advice, newsletter and more. Annual membership £5. For further info contact S Wheatley, 1 Ruby St, Darlington, County Durham DL3 0EN

Deluxe Cheats Disk User Group Steven Frew at 96 Campden Green, Solihull, West Midlands, B92 8HG. Software advice. Updates every 2 months! £4 for disk £2 for updates

Edinburgh Amiga Group Membership £5, includes free advice and PD. Contact Neil McRea, 37 Kingsknowe Road North, Edinburgh EH14 2DE with SAE

Enfield Amiga club For info contact Sean Clifton ☎ 081 8042867 32a Hoe Lane, Enfield, Middx Meet, swap, competitions, helping new users with problems

Enterprise PD 'Free' PD if you supply disks and postage. Membership £25 per year, £5 per month. T McLoughlin, 229 Barking Road, East Ham, London E6 1LB ☎ 081 472 0434

Eureka PD Small library with friendly service. 70p per disk. Contact Liam Allen, 5 Hartwell Close, Northampton NN2 8TT

Exeter 16 Bit User Group Andrew Deeley or Phil Treby at 25A Gloucestershire Rd, Exwick, Exeter, EX4 2EF. Meeting every Wednesday 7pm. Programming £6 per annum

Fylde Computer Club All aspects of computing. Meets 7pm, Lostock Gardens Community Centre, 2nd and 4th Wednesday of month. £15 per year, 50p on door. Contact Colin Biss, 90 The Esplanade, Fleetwood, Lancs FY7 7BQ ☎ 0253 772502

Galactik PD Swaps and sells PD. Contact E Newsome, 10 Crugan Ave, Kinmel Bay, Clwyd LL18 5DG. Demos, music, utilities, games, 99p for catalogue disk

Game Swap Club Swap original software and hardware. Membership £3. Contact Ade Ajidahun, St Andrews House, 125 North Road, St Andrews, Bristol BS6 5AH ☎ 0272 240399

Gamer-Link International pen-pal club for gamers. Free swap service, advice on tips and cheats. Life membership £5. Contact Stu, 28 Churchfield, Ware, Herts SG12 0EP.

GFA Basic Forum Contact J Findlay ☎ 0788 891197 or send SAE to 52 Church Rd, Braunston, Nr Daventry Northants NN11 7HQ. Free advice on programming in GFA. Also tutorial disk for sale. Beginners and advanced users welcome. Free membership

Gibraltar Amiga Users Club PD library, monthly newsletter, disk magazine, competitions, regular meetings (in the John Macintosh Hall). Membership from £6 per year. Contact David Winder, 7 Lime Tree Lodge, Montagu Gardens, Gibraltar ☎ 010 350 79918

Guru Masters PD demos etc, contact the Sheriff, 111 Sherbourne Rd, Banbury, Wolverhampton, WV10 9EU ☎ 0902 782277

Hampshire PD Club Mike Gallienne at 79, Carless Cl, Rownes, Gosport, Hants, PO13 9PW on 0705 585323. Public Domain Disks at 35p. Monthly competitions. SAE for more info to the above address. £10 a year

Harleys PD Swaparama Public domain swapping by mail. Contact G Varney, 140 Weston Drive, Otely, West Yorks LS21 2DJ ☎ 0943 466896

Hereford Amiga Group Membership free, help, exchange of PD and shareware. Lotus Turbo 2 Quad Player Championship. Contact John Macdonald, Alma Cottage, Allensmore, Hereford HR2 9AT ☎ 0981 21414

Hermit Computer Club Hardware help and information, program swapping. Meetings 7-10pm, Mondays. Membership £3 per term, 50p per night. Contact John Maynard, Hermit Centre, Shenfield Road, Brentwood, Essex CM15 8AG ☎ 0277 218897

Homesoft PD Over 2000 Amiga PD from 20p to 69p. Send SAE for free disk catalogue. Contact Chris Horne 23 Stanwell Cl, Wincobank, Sheffield S9 1PZ

HTS (Malta) Free membership. Contact K Cassar, Block 1 Flat, 6 H E Hal-Tmiem, Zejtun ZTN07 Malta ☎ 674023

Hyndburn Amiga Users Club Tuition, advice, PD, and more. Meets Mondays, 7pm, at the Canine Club, Accrington (£1 on the door). Contact Nigel Rigby, 7 Brecon Avenue, Oswaldtwistle, Lancashire BB5 4QS ☎ 0254 395289

In Touch Amiga Penpals, contacts, PD, swaps £2.50 per year. For more information contact P Allen, 0342 835530, PO Box 21, Lingfield, Surrey RH7 6YJ

Independent Commodore Products Users' Group Free PD software, 100 page journal, technical helplines and discounts. Contact the Membership Secretary, PO Box 1309, London N3 2UT ☎ 081 346 0050 after 6pm, or your nearest local branch:

Chelmsford ☎ D Elliott 0245 460189
Coventry ☎ W Light 0203 413511
Dublin ☎ G Reeves 010 353 1 288 3863
Macclesfield ☎ P Richardson 0298 23644
Mid Thames ☎ M Hatt 0753 645728
Solent ☎ A Dimmer 0705 254969
South Coast ☎ Brian Wise 0903 787559
South East ☎ J Bickerstaff 081 651 5436
South Wales ☎ I Kelly 0222 513815
South West ☎ P Miles 0297 60339
Stevenage ☎ B Grainger 0438 727925
Watford ☎ B Rigby 0923 264510
West Riding ☎ K Morton 0532 537318
Wigan ☎ B Caswell 0942 213402

JJC Amiga correspondence course £50 per year. Contact PO Box 19, High Wycombe, Bucks HP11 1UF. ☎ 0494 983347

Kent Youth Computer Group Contact Jim Fanning ☎ 0233 629804 North Youth Centre, Essella Rd, Ashford, Kent. Meetings at the North Youth Centre, Thursdays 7 – 10pm computer fair visits, video and DTP work, monthly newsletter Membership 40p per month

Lothian Amiga Users Group Contact Andrew Mackie ☎ 0506 630509 52 Birniehill Ave, Bathgate, W Lothian EH48 2RR Advice and help in buying hardware, software etc, group buying, dealers' circulars welcome. Membership free

Maritime Amiga Club Maritime computing, interact with seafarers ashore on Amigas. Contact CDR K Osei, GN Ships Refit Office, 51 Rue de la Bretonniere, 50105 Cherbourg, France. ☎ 33 33225447

Marksman (Trojan Phazer user group) Contact David Green, 67 Thicket Drive, Maltby, Rotherham, S Yorkshire S66 7LB Promotes use of the Trojan Phazer, swaps PD and own programs, disk magazine

Masters of Raster AMOS coding, DPaint, tutorials, ray tracing, open to other suggestions. Meets Bournemouth Grammar School, Weds evenings, Sunday pm. Free membership. Contact Chris James, 10 Mavis Road, Charminster, Bournemouth, Dorset ☎ 0202 510161

Mystery Game Swapping Send a game and receive a mystery one back. Deborah Tully, 08 Lime Court, Pendleton, Salford, Gtr Manchester M6 5EG

N Ireland Amiga User Contact Stephen Hamer, 98 Crebilly Rd, Ballymena, Co Antrim BT42 4DS. Disk based mag £2.50 per issue. Free PD, SAE for further info

New Hall Amiga Users Club Games, graphics, music, Workbench programming. Meets 7pm every Tuesday, New Hall Social Club, 104 Bury Rd, Dawtenstall. Membership £5 per year, under 16s not allowed. Contact Bill Grundy, 115 Stanley St, Accrington, Lancashire ☎ 0254 385365

Numero Uno PD, swapping, competitions, pen pals. £3.50 per annum. Contact Dillon Eyre, 21 Burstall Hill, Bridlington, N Humberside YO16 5NP

Pascal Programmers Group Disk-based newsletter for HighSpeed Pascal users. Free membership. Contact Colin Yarnall, 93 Manchester Rd, Wilmslow, Cheshire SK9 2JQ

Pennine Amiga Club 26 Spencer Street, Keighley, West Yorkshire BD21 2BU. Free membership, free advice and a newsletter. Contact Neville Armstrong for more info ☎ 0535 609263

Perth and District Amateur Computer Society For further information contact Alastair MacPherson 137 Glasgow Rd, Perth. Meetings third Tuesday in every month, 8pm. General advice, talks, Amiga PD. Membership £6 or free for under 16s

Pete's PD PD from only £1 per disk. Send 50p for disk catalogue to Peter Garrett, Chestnut Cottage, White Lion Road, Amersham, Bucks HP7 9JR

Public Domain Exchange Demos, music, utilities, animation. Annual fee £8 Contact D McLeish, 26 Taunton Ave, Leigh, Lancs WN7 5PT

Public Domain User Group Swaps PD, provides advice. SAE to 12 Oxford Rd, Guildford, Surrey

PUG Contact S Jackson ☎ 0446 772331 Whitebeam Cottage, Trerhyngyll, Cowbridge, S Glamorgan Cheap PD library, swap hints, reviews, articles etc. Send an SAE for further details

Quality Amiga PD Only £1.20 per disk. Send SAE for free catalogue to John MacLeod, 4 Worcester Avenue, Grimsby, South Humberside DN34 5EY

Redburn Computer User Group Contact Paul Armstrong ☎ 0294 56003, 12 Highfield St, Kilwinning, Ayrshire KA13 7BN. Meetings at the Redburn Community Centre, Dickson Drive, Irvine. Group meets every second Wednesday from 5 Aug 92, 6.45 – 9.30pm. Help, ideas, PD and shareware, graphics and business. Membership 75p per meeting; £7 per year

Rye Computer Club Swap/meet at the Rye Community Centre. For info contact Oliver Campion, 71 The Mint, Rye, E Sussex TN31 7DP ☎ 0797 222876

Serious Amiga Users Membership £5, £1 admission. Contact J Kucak for more: ☎ 0706 290387. Fortnightly meetings 7.30-11 at the High Crompton Conservative Club

Shieldsoft PD at Wilmar Lodge, 13 Churton Rd, Rhyl, CLwyd.LL18 3NB. Write for more information. Basic programming help. Advice on the CLI and AMOS. Disks from only 50p to 80p. Membership free ☎ 0745 343044

Sherlock PD Quarterly disk mag, help and advice for beginners. 50p per disk. A Doyle, 44 Milton Street, Warrenpoint, Co Down, N Ireland

Shropshire Amiga Link Advice, monthly disk mag, PD. Membership fee £15 per year. Contact N Cockayne, 2 Dodmoor Grange, Randlay, Telford, Shropshire TF3 2AW ☎ 0952 591376

Slim Agnus 115 Brocks Drive, North Cheam, Sutton, Surrey SM3 9UW. Group meets the last Thursday of every month. PD library, BBS, advice from Amiga experts. Contact Philip Worrel.

Software City Swapping, competitions, club magazine. Membership £8. Contact N Richards, 9 Hollis Close, Manor Estate Farm, Rawmarsh, Rotherham, S Yorks S62 7LX or ☎ 0709 526092

Software Exchange Club Free help and advice. Contact Michael Lacey, Fern's Post Office, Enniscorthy, County Wexford, Republic of Ireland

Software Exchange Service 13 Bournville Lane, Stirchley, Birmingham, West Midlands B30 2JY. For more info ☎ Michael Pun 021-459 7576

South 16 Bimonthly mag and disk, also PD library. £10 per year. Send SAE to Bruce, PO Box 16, Southampton SO9 7AU

Southend Team Music, PD. Free membership. Contact Scotty, 52 Prince Avenue, Southend-on-Sea, Essex SS2 6NN ☎ 0702 333974

Southport Amiga Users Advice, friendly evenings Mondays at 8pm. No charge, discounts from local store. For info contact Michael Mitcham, 5 Easdale Drive, Ainsdale, Southport, Merseyside ☎ 0704 79936

South Wales Club Newsletter, PD library, free newsletter, programs, help and advice. For more info contact D Allen 53 West Avenue, Trecenydd, Caerphilly CF8 2SF

Steel PD, cheats, ideas, music, art, programming, hardware mods. Free membership (postal only). Contact James Whitehead, 33 Middle Cliffe, Drive Crowedge, Sheffield S30 5HB

The Amiga Studio Friendly, helpful advice for serious users of the Amiga. Monthly newsletter, PD library, free loan of equipment to members, bar. Meets 7pm Thursdays, Mitchells Club, Scotia Road, Tunstall. Contact Dave Rose ☎ 0782 815589

Twilight Advice on hardware and software,Fred Fish PD. Free membership, disks 50p each. Contact 13 Mavis Court, Ravens Close, London NW9 5BH

UK Subs The Hanger BBS, trading post for PD files, swapping. Free membership. Contact Diddy / Arklight ☎ 0525 875518

Unique Styles Derek at 15 Montgomery Rd, Highbrooms, Tunbridge Wells, Kent ☎ 0892 518319. By post only. For Amiga artists, programmers/musicians. Free membership

Video Editing Club Invites DTV users for titling and editing. Quarterly magazine, send SAE for details to Danny Fisher,3A Thornbridge Road, Iver Heath, Bucks SL0 0PU

Video Visuals Exclusively for video producers, PD library, genlocking, digitising, quarterly disk magazine. Membership £10 per year. Contact Chris Brown, 4 Lavender Close, Witham, Essex CM8 2YG

Wardray Hern Consortium User group for Amiga and possibly others. Membership fees to be discussed and incurred. PD library to be set up. Also Hern connection – worldwide contacts wanted. SAE and disk to WardCon info, (AS) Warren Hardy, 21 Stockfield Ave, Fenham, Newcastle upon Tyne NE5 2DX

Warpdrive Help-line, PD library, bi-monthly disk mag, free drinks, competitions and infosheet. £15 per year. Contact B Scales 110 Burton Ave, Balby, Doncaster DN4 8BB ☎ 0302 859715

WCSPSA! Help available. PD disk of your choice and newsletter every month. PD at £1. Membership £25. For further info contact A Jamieson ☎ 0749 677609

Willow PD Free advice, disks only 90p each. Free membership. Contact Willow PD, 2 Longbridge Close, Sherfield-on-Loddon, Basingstoke, Hants RG27 0DQ ☎ 0256 882654

Wrexham District Computer Club PD, library, equipment loan. 10p to join, 50p to get in. Meetings at the Memorial Hall, Wrexham every Thursday, 7-10pm. Contact Paul Evans, 3 Ffordd Elfed, Rhosnesi, Wrexham, Clwyd LL12 7LU

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SOFTWARE for FREE

Whether you're looking for utilities, demos, or useful applications, there's plenty of Fish disks in the public domain. But only the best are good enough for Captain Wrigley's table!



Now your Amiga can display a silly picture while it's loading...

We're getting straight down to some fishy business this month, with Fred Fish disks 751 to 769, courtesy of Anglia PD, which is doing a great job of sending me the latest releases every month. But that's not all – there's plenty of other good stuff about at the moment and, as always, we'll be checking out the best of the bunch.

BOOTLOGO

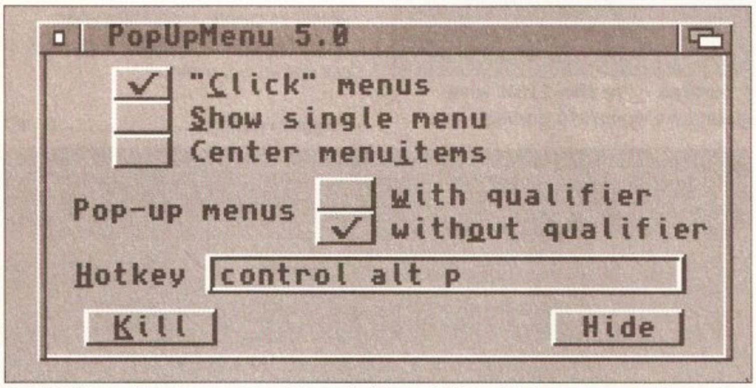
Fish disk 754

Let's start off with something completely pointless – but quite amusing nonetheless. *BootLogo* was written by Markus Illenseer, and simply displays an image on the screen as your Amiga boots up from hard (or even floppy) disk. He found that because his hard disk is virtually silent, he wasn't sure that the Amiga was actually doing anything – and putting a picture on the screen at least shows that the beast is alive. As you'll see from the accompanying illustration, the picture is a familiar one to anyone who uses a certain product from Microsoft – although it has been modified a tad from its original appearance.

To use *BootLogo*, just RUN it somewhere at the beginning of your startup-sequence. It will close automatically when it's no longer the frontmost window – which will normally be when the Workbench screen appears. Its only limitation is that it requires AmigaDOS 2.0 to run.

And that's it, really. Job done. Mickey taken. On to the next thing.

Program rating 7/10



PopUpMenus **(reviewed over the page) is a utility which pops up a window's menu items anywhere on the screen when you hit the right mouse button**

RATING THE PROGRAMS

Just to be awkward, I rate the software that I review in two different ways, depending on what it is. Disk magazines, collections of clip art and the like are given a 'value for money' rating, since you're essentially paying for one thing, or group of things, on the disk.

Single programs which appear in a collection of others, or programs which I've downloaded from bulletin boards, are given a 'program rating', which reflects how good I think they are, taking into account usability, bug-proofness, my own particular (or should that be peculiar?) tastes and so on. Both ratings are out of a maximum possible 10.

BEGINNERS START HERE

What is PD?

PD is a general term which many people incorrectly use to refer to all freely-distributable software. In fact, PD (which stands for Public Domain) software is only one branch of this area; the other main one is shareware.

Essentially, PD software may be copied and used by anyone, although some authors place restrictions such as not allowing a PD library to charge more than a certain amount for the disk.

Shareware, on the other hand, should be treated more like commercial software. Although you are allowed to copy and pass around shareware programs, if you like one then you should pay the requested fee to the author – it's normally around £15 or less, and often entitles you to an upgraded version or a printed manual. Paying your shareware fees encourages software authors to write more programs – and if they don't, the Amiga scene will be a poorer place. Don't think that you're paying money for nothing, either – often hundreds or even thousands of hours of work have gone into creating a program, and it's only right that the programmer receives some reward for his or her work.

The third branch of software that we cover here is called licenseware. This is a form of shareware which is licensed to one (or more) PD libraries. In essence, when you buy a licenseware program you are buying shareware and paying the license fee at the same time. For this reason, you should treat any licenseware that you buy exactly as you would treat a piece of full-price commercial software – don't pass it around to your friends. You've only bought the right to use it yourself.

Can I pass other people copies?

Yes – that's the way that PD reaches a wider audience. Just make sure that you have followed the author's requirements for distribution. These are normally things like not charging more than a certain amount for the disk, or that you make sure that all the original documentation is included on the disk.

You can also pass on shareware – but not any registered copies of programs. If, when you pay your shareware fee, the author sends you an improved version of the program, then be careful not to give that out. Only pass on unregistered shareware.

You should not, of course, pass on licenseware – it should be treated in the same way as registered shareware.

POPUPMENU
Fish disk 756

PopUpMenu is a public domain program from Martin Adrian which allows you to select a window's menu items without having to move the cursor up to the top of the screen every time. Clicking the right mouse button anywhere on the screen produces a pop-up menu containing all the window's menu titles. Selecting one of these produces the menu items as sub-menus. It sounds more complicated than it is – in fact, *PopUpMenus* is a very simple idea, which has been elegantly implemented.

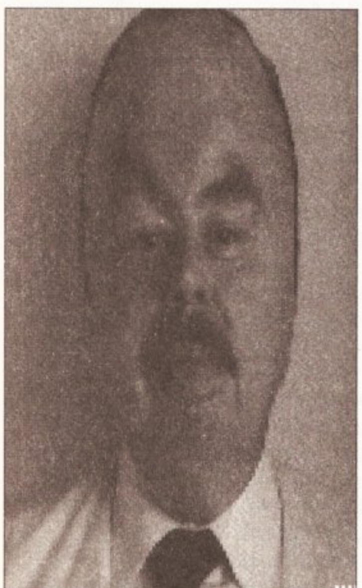
"With a mouse-intensive program... PopUpMenu is a godsend"

The program is launched either from the CLI or WorkBench – so you can either edit your startup-sequence or just put the program in the WBStartup drawer. Once it's running, double-clicking the icon again produces a window with various configuration options – there's no messing about with a separate Preferences program.

With a mouse-intensive program, such as an art or DTP package, *PopUpMenu* is a godsend – especially if you've slowed down the mouse's tracking speed for accuracy, so it normally takes you a couple of drags to get the cursor to the top of the screen. As a final recommendation: it's a program which has already found its home in my WBStartup drawer.

Program rating 8/10

CMDEMO
Fish disk 757



Just one screen from the animation demo of *CineMorph*, which can be found on Fish disk 757

Normally demos don't get a look-in on these pages, but I just couldn't let the *CineMorph* animations go unmentioned. They are demonstration animations for the Great Valley Products (GVP) company's *CineMorph* program (reviewed in full on page 70), which allows you to morph between two or more images, and even between moving sequences of images. Apparently the product supports a variety of formats including HAM-E and DCTV, and will generate Op-5 ANIMs. Certainly, if you've never seen what morphing actually is, or you want to know what *CineMorph* is capable of, these two short animations are well worth checking out.

Program rating 5/10

GEOTIME
Fish disk 758

You know, I sometimes wonder why people bother. I mean, surely there are some things that you write as programming exercises but never inflict on the general public? And even if you did, surely you wouldn't have the gall to actually ask for money for them? Well, the author of *AmigaTrek* and *Distant Suns*, Mike Smithwick, has done just this in the shape of *GeoTime*. This is a collection of three programs which variously claim to show a 2-D earth map with day and night sides shaded, and the earth as a globe – again, with shading showing which bits of the planet are in sun at any given time. For these gems of programming expertise, Mr Smithwick asks that we send him a shareware donation of $20.

Now, I would be in favour of this, except for just a few reasons:

- It's slow. The display takes a good five seconds to initially appear. And after you've changed options the program takes a few seconds to reflect these on the screen.
- It doesn't work properly. The globe version of the program, *Geotime_g*, doesn't update its menus properly to show the size of the window.
- The display is hideous. Turn on the names of cities and their clock times, and things overlap in a most unpleasant way.
- It's no bloody use whatsoever.

Apparently *Distant Suns*, an astronomy simulation by this guy, won the 1988 Consumer Electronics Show award for Most Innovative Educational Program, and the 1991 Commodore Developer's Choice Award. All I can say is that it must be a damned sight better than *Geotime*. The only reason that this program gets a rating of 2/10 is that at least it (sort of) works.

Program rating 2/10



***Geotime:* an intriguing idea for a package, perhaps – I'm afraid that what really lets it down is the fact that the programs are complete garbage**

ABACKUP
Fish disk 759

This is a $10 shareware backup package written by Denis Gounelle. As the name suggests, it's designed to let you take a backup of your vital data – before you suffer the disk crash that's inevitable the minute you complete a really important piece of work.

Unlike *BackUp* (reviewed a couple of issues ago – the most recent version of that program is available on Fish disk 767), *ABackup* doesn't allow you to create incremental backups – that is, only saving data which has changed since the last time. Some people will see this as a positive point – incremental backups are fine until you realise that you've lost the original set of disks – but in reality it's something of a restriction.

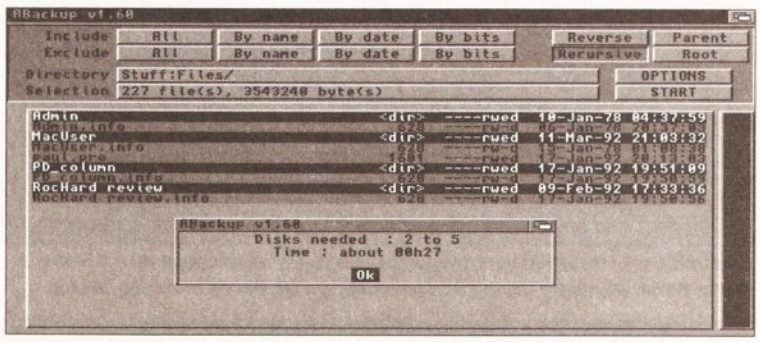
Still, this apart, the program seems to work perfectly well. The user interface is clear and easy to use, and there are user options to let you decide whether to verify data after it's been written, whether to compress the data as it's saved to floppy disk (compressed data takes less space, but the compression process can take some time), and so on and so forth.

You can select the files to back up by clicking on them, by name, by date created, or whatever. In fact, you could implement some form of incremental backup manually, since you could back up just those files which didn't have their archive bit set, but this is rather cumbersome and prone to errors. If you back up to floppy disks – rather than a disk file on a hard drive – they are written in a special format, so you shouldn't format them first.

The program has some neat functions; for example, if you specify the disk drive combination 'df0:,df1' as your backup units, the first chunk will be written to a disk in df0:, the second to df1:, the third to df0: and so on – all without disk requesters, so you can just sit there mindlessly swapping disks with no worries.

If all you want is a simple backup program, you could do far worse than *ABackup*. And those with more specialised needs may find that its support for things like selecting files according to flag settings, and the ability to create a data file with selection criteria already specified, will come in handy.

Program rating 8/10



***ABackup* is (surprise, surprise) a backup utility with a reasonable range of functions – although incremental backups aren't catered for**

CDTV-PLAYER
Fish disk 759

I haven't been able to test this program, by Daniel Amor, since I don't own either a CD-ROM drive or a CDTV. However, I thought that I should mention it for those of you that do own one of these devices.

continued on page 125

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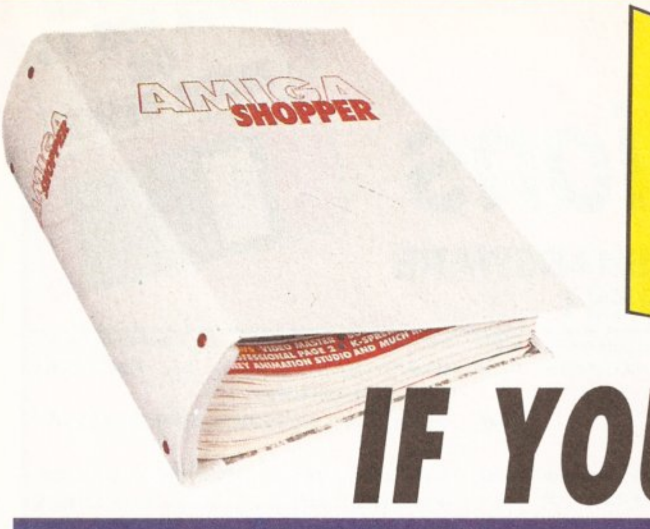
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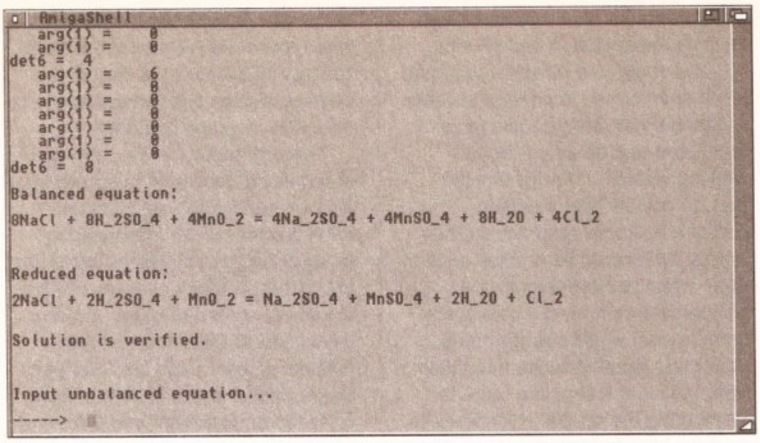
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Your chemistry homework could get a lot easier with *ChemBalance's* help

continued from page 120

Essentially, this program will let you play audio CDs on your CD-ROM player while using the computer for other stuff at the same time – in other words, it multitasks. Controls include all the normal shuttle commands – rewind, fast forward and so on, as well as displaying things like track time played/left and overall time played/left. If it works, it will no doubt rapidly find its way onto the hard disks of all CD-ROM users.

Program rating ....N/A

CHEMBALANCE

Fish disk 759

Boy, do I wish I'd had this program when I was doing A-Level chemistry. It's an ARexx script which balances unbalanced chemical equations. (If you've no idea what one of these is, move on to the next review – you don't need this program.) To run it, just copy it to RAM: and enter 'rx ram:chembalance' from the Shell. You are asked for your equation, and the program goes off and does the work. Entering the equations is simple – subscripts are preceded by a '_' so water, for instance, is H_2O. Dead easy.

Because this is an ARexx script, it can take some time – a few minutes if the equation is at all complex. But even so, it's likely to be faster than most people at doing the job – and getting the Amiga to do the work means that you can get on with other stuff. As it's processing the equation, you get cryptic messages like 'det6 = 8' which let you know that things are chugging away, and eventually the solution appears. Solving the equation NaCl + H_2SO_4 + MnO_2 = Na_2SO_4 + MnSO_4 + H_2O + Cl_2 took about five minutes to produce the solution on an Amiga 500 Plus. (The solution, by the way, is 2NaCl + 2H_2SO_4 + MnO_2 = Na_2SO_4 + MnSO_4 + 2H_2O + Cl_2.)

ChemBalance 1.0 is freely distributable, and was written by Patrick Reany. It essentially reduces the problem to a series of linear equations and then solves them. Because of this it can't deal with problems like 'O_2 + O_2 = O_3', but it should still prove useful to anyone struggling with the basic concepts of balancing equations. At the very least, you can use it to check your homework!

Program rating 7/10

ARESTAURE

Fish disk 760

Jean-Yves Proux has written a program which could just be the most useful utility you put on your Amiga. It's a PD program that allows you to recover files that you've accidentally deleted, either from the Shell or the Workbench. It will work with Old Filing System (OFS) and Fast Filing System (FFS) disks only – so if you've got an MS-DOS partition or whatever on your hard disk, that won't appear.

Before you get too excited, you should realise that the program is only likely to be able to recover recently-deleted files – and it may not even be able to do that, depending on how full your disk is, how fragmented it is, and the current phase of the moon. Essentially, when you delete a file, the Amiga marks the sectors of the disk that previously contained the file as free, so that they can be used to store other things. However, unless data has actually been written to those sectors, the file should still be there, intact. I say 'should be' and, indeed, it often is. So, recovery is basically a matter of looking for files that have been marked as deleted, and allowing you to 'undelete' them.

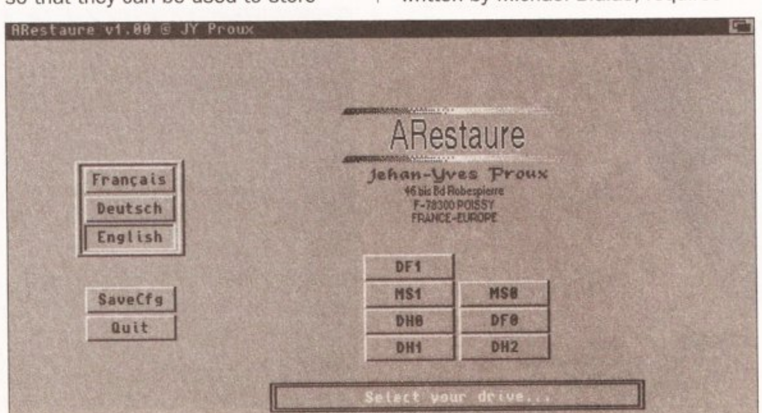
> **"most things trashed today were recovered without a hitch"**

ARestaure is multi-lingual: its simple user interface is presented in English, French or German, depending on your selection. To search for files, just hit the button corresponding to whichever drive you want to examine, and the program will go off and do its thing. This can take some time – searching a 40Mb hard drive with 18Mb in use took getting on for five minutes. When the search is complete, a file requester appears with the names of all the deleted files that the program has found. Click on the ones you want to recover, hit the button and they are placed in the T: directory (which is, by default, in RAM:). Note that it's not a good idea to recover files to the same directory from where they were lost. So, if you define T: as being your hard disk in your startup-sequence, you'd do well to change it to another drive or to RAM: before you start. Otherwise, you could find that recovering one file makes another irretrievable.

During my tests, the program worked pretty well. It didn't find stuff that I'd thrown away weeks ago, but most things trashed today were recovered without a hitch.

The real motto, of course, is to double- and triple-check before you delete a file to make sure that it really isn't needed. But if even those safety measures fail, *ARestaure* might just save your bacon.

Program rating 9/10



Restore accidentally-deleted files with *ARestaure*, by Jean-Yves Proux

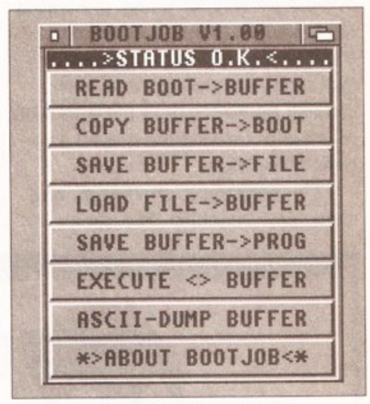
BOOTJOB

Fish disk 760

This 10DM shareware program, written by Michael Bialas, requires AmigaDOS 2.0. It lets you store, copy, install, view, execute, or save as executable, any disk bootblock.

The most powerful feature is the 'save as executable' option. In essence, this means that you should be able to run any boot-utility, virus checker, game loader or whatever from the CLI. This also means that you can load another program (a screen grabber, for instance) before you run a disk which formerly needed to be booted in order to work. As a test, I saved the *Lemmings* bootblock as an executable file and – what do you know – I can now run *Lemmings* by just typing its name from the CLI. (Of course, you still need the floppy disk in the drive, but at least now you don't need to re-boot the machine.)

BootJob's user interface is extremely simple – it's a small window with eight buttons and a tiny space for status messages. The buttons are, in order: read boot block to buffer; copy buffer to boot block; save buffer as a file; load a file into the buffer; save the buffer as an executable program; execute the bootblock in the buffer; produce an ASCII dump of the contents of the buffer; and produce a copyright message for *BootJob* itself. The program only works on DF0: – although that isn't really a restriction in any practical sense.



Now you can save floppy disk bootblocks as files which are executable from the CLI, thanks to *BootJob* from Michael Bialas

The program comes with 33 bootblocks saved as files, so you can play around and experiment to your heart's content. The possibilities for this program are endless: you may find that you can screen-grab games (although that's fairly unlikely, since they tend not to be friendly to screen grabbing programs); you may be able to give yourself infinite lives; you can easily put bootblock virus checkers onto

your own disks; and more. I'm certainly happy – I should now be able to get screen grabs from far more programs than before.

Program rating 9/10

JCGRAPH DEMO
Fish disk 760

In *JcGraph,* Jean-Cristophe Clement has created an extremely powerful business graph creation package, which will save the images in a variety of formats – including EPS (Encapsulated PostScript), IFF ILBM, *Geo 3D* and *AegisDraw 2000.* The program takes data from a plain ASCII text file and creates 2D and 3D graphs in formats such as pie charts, line, bar and stack charts and so on. The resulting graphs can be rotated about all three axes, and the perspective can be changed. It doesn't provide for titling, graduated backgrounds or that sort of thing – the thinking behind the product is that these can be added in other drawing packages after the hard work of actually creating the graph has been completed.

The package is shareware, and costs $47 Canadian. The demo version on Fish disk 760 is limited in that it limits data to 3 by 3 values, and will not save the graphs. Other than that, all the functions are implemented. It works on an interlaced, NTSC-sized screen, so you'll really need a monitor, rather than a TV, to use the program.

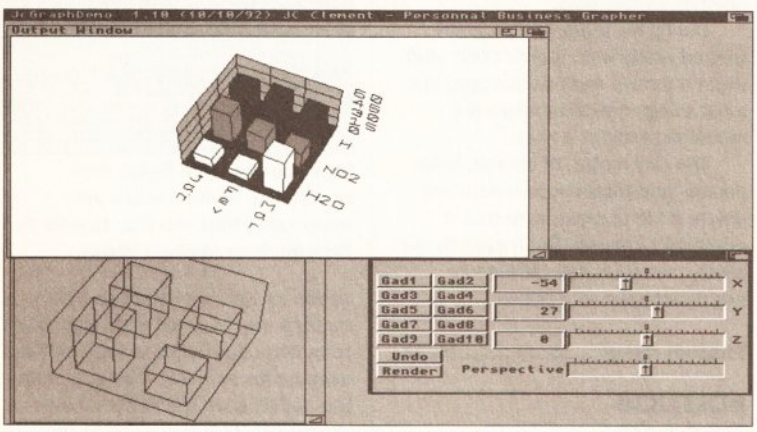
When you've loaded a graph type (loads are available) and some data, you will have three windows on-screen: a preview window, a line-image of the graph and a data entry window from which you can select rotation and perspective parameters. This can be done either by typing in values, or by moving the slider gadgets – as you do this, the line drawing of the graph moves at the same time, so you can see exactly what it will look like. When you think you're satisfied, hit the 'Render' button and the output window will contain a full-coloured version of the graph. If you find that this is too small, re-size the window and hit Render again to get a bigger version. The colours used can easily be changed, and it's no hassle to try out a different graph style.

"an extremely powerful business graph creation package"

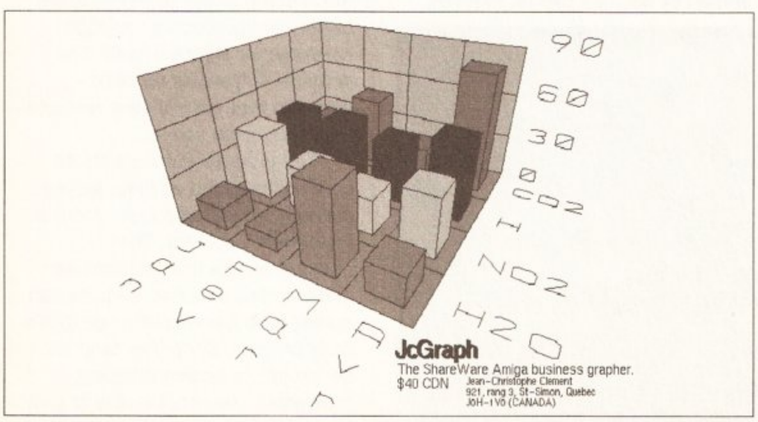
The range of output options means that virtually every page layout and graphics program around should be able to import the image for final manipulation and printing.

This really is a powerful program. It's a shame that, according to Jean-Cristophe, not many people have registered and obtained the full working version. I'd have thought that, to anyone who needs to produce business graphics on their Amiga, $47 would be a small price to pay – when you consider that a comparable commercial package (if there is one) would cost far more than that. Jean-Cristophe has taken what I think is a sensible route to distributing the program: it shows its flexibility, but is limited enough that you're likely to want the real thing.

Program rating 9/10



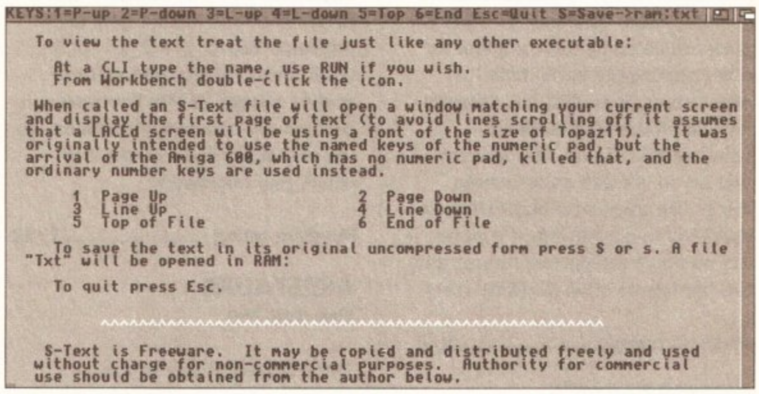
Fish disk 760 contains an impressive demonstration version of Jean-Cristophe Clement's *JcGraph* – a powerful shareware graphing package



The plot thickens: a sample 3-dimensional graph produced by *JcGraph*

document. It uses text compression when that would reduce the file size, taking into account the size of the decompression code which has to be added to the executable file.

Unfortunately, though, any actual stand-alone document is so awkward and un-intuitive to use that I don't think anyone will be interested in using *S-Text.* For instance, every time the text is scrolled, even by one line, the whole screen redraws. And the keys used to scroll the text are ridiculous: 1 for page up, 2 for page down, 3 for line up, 4 for line down, 5 for top of document and 6 for end of document. Chas says in his documentation that he was going to use the relevant keys on the numeric keypad until the A600 came along.



***S-Text* is a stand-alone text viewer, but any advantages it may offer are outweighed by one major consideration: it's a dog to read text in!**

S-TEXT
Fish disk 760

This is an admirable idea, which unfortunately loses rather a lot in the implementation. *S-Text* is a program for producing stand-alone text documents, which can be viewed directly from the CLI by typing their name, or from the Workbench by double-clicking – there's no need for a text viewer such as *More* or *MuchMore* to be present on the disk.

The idea is a good one – and the author, Chas Wyndham, has clearly thought hard about the requirements. *S-Text* produces files which are, in the worst case, only 1K larger than the original text

But what's wrong with using the standard cursor keys?

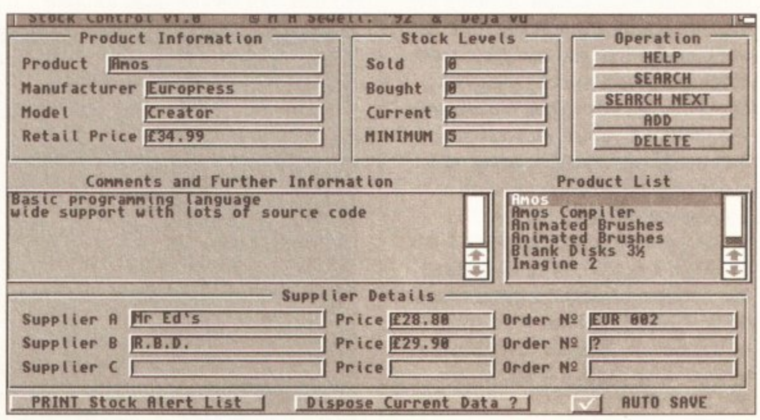
The need for something like *S-Text* is certainly there – those who pack their disks to the limit with data would welcome a good implementation. Unfortunately, this isn't it.

Program rating 4/10

STOCK CONTROL 1.0
Deja Vu disk L/111

This is a licenseware program (it costs £3.99 plus 50p postage & packing) written by MA Sewell using *CanDo.* It does exactly what the

continued on page 128



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continued from page 126

name implies: provides you with a stock control system. The author is very apologetic about using *CanDo* – in his documentation he keeps saying things like "Don't laugh", and "It's fine for planks like me". Well, actually it's a very professional-looking system, so there's really no need for him to be embarrassed!

Of course, for four quid you're not going to get the most fully-featured package in the world, but on the other hand *Stock Control* seems to have just about everything that you'd need for a basic stock system. Adding a new stock line is easy – just hit the 'Add' button and type away. There are fields for the current and minimum stock levels, and two more fields for quantities bought and sold – enter a number in either of these and the current stock level changes automatically. There is space on the screen for details like manufacturer, model name/number and retail price, as well as for up to three suppliers, their trade price and any order reference. A scrolling window lists all the products, and if you have a lot you can search for text in any of the product, model, manufacturer and comments fields.

If your stock level drops below the minimum, a window appears simply saying 'stock alert' – sadly there's no more information than that. However, if you hit the 'Print Stock Alert List' button, details of all understocked items will be sent to a printer. The documentation hints that it's possible to list them on the screen too, but refers to an icon that just doesn't exist!

The auto-save feature is a useful addition not often included in this kind of program – it saves the data at 10-minute intervals if the relevant button is ticked.

There are a couple of raw edges to the program, but the most serious one is that it's far too easy to delete a stock line by mistake – and there's no 'Undo' feature to get it back. Hitting the Delete button removes whatever's on the screen – with no confirmation requester to make sure that you know what you're doing. If you do this by mistake, and if you haven't made changes to any other data, you can quit the program without saving changes and when you launch again the data will be back. But if you've entered other data, then not saving changes will lose this.

"Stock Control seems to have just about everything that you'd need"

My only other worry is that I once seemed to make the program quit suddenly and without warning while I was using it. But since I couldn't reproduce the problem, it's possible that it was something stupid I did, rather than a bug. Judicious and frequent saving of the data would mean that this isn't too much of a problem anyway.

Apart from those two concerns, though – and I'm sure the Delete problem is a change which can easily be made – this is a very creditable first major programming effort. It shows that *CanDo* can be used to create professional-looking applications, and looks like it is actually a useful program.

Program rating 7/10



SuperDuper* – a disk copying and formatting program, and just one of the many utilities on *Assassins Handy Tools 3

ASSASSINS HANDY TOOLS

Aardvark PD disks U/186, U/187, U188

There are three disks in this collection of utilities, and each auto-boots to provide an attractive menu system. I'm not totally convinced, personally, that putting a menu on a disk of utilities is that useful – after all, that means that you've got to re-boot your Amiga to take full advantage of them (unless of course you use the *BootJob* program described earlier in this column). Especially since all the programs have been renamed by the compilers of the disks and given really useful names like '1', '2', '3' and so on. Finding the program you want from the CLI or Workbench (which is even worse, since all the icons have been removed) is a real pain in the neck.

"Finding the program you want... is a real pain in the neck"

Still, if you can live with that annoyance, there certainly seems to be a reasonable range of utilities on these three disks – although not all the programs are the very latest versions available.

There's not enough space here to list all the programs on each disk, but here's a fairly representative sample of the selection:

Disk 1 (U/186)

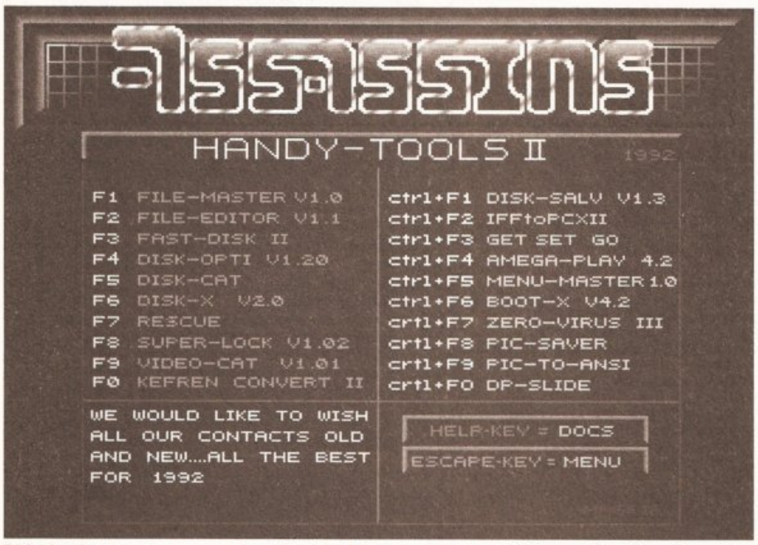
- *Text Engine* – a text processor
- *Typist* – a touch typing tutorial/testing program
- *Loan Calculator* – guess!
- *Last Hope* – attempts to recover deleted files from Standard File System floppy disks, even when their headers have been wiped
- *Virus-Check* – checks for a range of Amiga viruses
- *Calendar Factory* – produces text-format calendars for use with programs such as DTP packages.

Disk 2 (U/187)

- *File-Master* – a file/disk organising utility (basically another permutation on the SID formula)
- *DiskOpti* – copies disks so that all files are stored contiguously, and are therefore faster to read, because the disk drive's heads don't have to skate around the surface of the disk
- *DPSlide* – plays slide-shows output from *DPaint* and similar programs
- *Pictsaver* – a screen-shot program, although not the latest version
- *IFF 2 PCX II* – a file conversion utility which turns IFF graphics files into the IBM PC-standard PCX format, so they can be read by virtually any PC graphics program
- *RescueSource* – attempts to retrieve source code created in any pure text editor from the Amiga's memory if you haven't saved it before a crash. It's intended for use by programmers, but useful if you're using a text editor which just produces ASCII.

Disk 3 (U/188)

- *SuperDuper* – a disk copier/formatter which should copy and verify a disk in a minute and a half
- *PicBase* – a cataloguing program which allows you to organise and



This is the menu screen for disk 2 of the *Assassin* utilities collection. Despite the title, there are no telescopic rifles, garrottes or rare poisons to be seen!

manage any IFF images and brushes stored on your hard disk. It displays an 8- or 16-greyscale image of each file, with information such as the pathname, creation date, file size and so on

- *Mega-Mon 3.2* – a monitor program, whose documentation is all in German
- *MultiRipper* – a sound ripper program, for grabbing tunes from other peoples' programs
- *T3E* – turns a text file into an executable program, so that you don't need a text viewer such as *MuchMore*
- *SnoopDos* – prints details of all calls made by any program to load libraries, devices, fonts and specific files. This is great if you're not sure why a program isn't working, and is also available on this month's *Amiga Shopper* cover disk – see page 22.

The user interface for these three disks isn't exactly what you'd call consistent – it's interesting to see how the menu evolves from disk one to disk three, so that by the time you reach the third one it's far easier to use. However, all in all, these three provide a collection of utilities which, while not essential, are certainly useful enough to be worth considering. If you're already a power user, you've probably already got most of these programs – at least, the ones that you will find useful. If you're new to the Amiga, though, you could do worse than to get in an order for them.

> "these three... are certainly useful enough to be worth considering"

Value for money......................7/10

WHERE TO GET IT

There are two main ways to get hold of Amiga PD and shareware: from a bulletin board or from a PD library.

The advantage of using a bulletin board is that often the latest software is uploaded as soon as it's available. On the down side, you need a modem to connect, and you'll have to pay phone charges (and sometimes a connection fee to the bulletin board as well).

There are a growing number of bulletin boards with a wide range of Amiga software available for download. Check out 01-for Amiga (071 377 1358) and the Cheam Amiga Bulletin Board (081 644 8714). Another good option is joining CIX (the Compulink Information eXchange), which not only has Amiga software but also contains conference and file areas on a wide range of subjects. Many of the *Amiga Shopper* writers have accounts on CIX, so you can get first-hand advice on your problems, too. For more details, call CIX on 081 390 8446 (voice) or 081 390 1255 (modem).

If you don't want to use a bulletin board, the other way to get PD software is from a PD house. Many advertise in *Amiga Shopper*, and you'll find a comprehensive list of names and addresses at the end of this article. Expect to pay between 99p and about £2.50 per disk – there's often a discount if you buy in bulk, too. As for the difference between the companies which charge 99p and those which charge £2.50 – well, try both types. There are brilliant, totally professional PD houses which charge less than a quid, and there are totally incompetent (dis)organisations which charge more than twice that.

UK PD HOUSES

Amiganuts United
169 Dale Valley Road
Hollybrook
Southampton

AMOS PD
1 Penmynydd Road
Penlan
Swansea
SA5 7EH

Anglia PDL
115 Ranelagh
Felixstowe
Suffolk
IP11 7HU
☎ 0394 283494

Blitterchips
Cliffe House
Primrose Street
Keighley
BD21 4NN
☎ 0535 667469

Crazy Joe's
145 Effingham Street
Rotherham
South Yorks
S65 1BL
☎ 0709 829286

Deltrax PD
36 Bodelwyddan Ave
Old Colwyn
Clwyd LL29 9NP
☎ 0492 515981

Deja Vu
7 Hollinbrook
Beech Hill
Wigan WN6 7SG
☎ 0942 495261

Essex Computer Systems
118 Middle Crockerford
Basildon
Essex
SS16 4JA
☎ 0268 553963

George Thompson Services
Cucumber Hall Farm
Cucumber Lane
Essendon
Herts
AL9 6JB
☎ 0707 664 654

ICPUG
PO Box 1309
London
N3 2UT
☎ 081-346 0050

NBS
1 Chain Lane
Newport
Isle Of Wight PO30 5QA
☎ 0983 529594

PD Soft
1 Bryant Ave
Southend-on-Sea
Essex
SS1 2YD
☎ 0702 466933

Pentire PD
10a Hag Hill Lane
Taplow
Maidenhead
Berks SL6 0JH
☎ 0628 666641

Riverdene PDL
30a School Road
Tilehurst
Reading
Berkshire RG3 5AN
☎ 0734 452416

Telescan Computer Services
Handsworth Road
Blackpool FY5 1SB
☎ 0253 22296

Sector 16
160 Hollow Way
Cowley
Oxford
☎ 0865 774472

Seventeen Bit Software
PO Box 97
Wakefield
West Yorks
WF1 1XX
☎ 0924 366982

Software Expressions
Unit 4
44 Beauley Road
Southville
Bristol BS3 1PY
☎ 0272 639593

Softville
Unit 5, Stratfield Park
Elettra Avenue
Waterlooville
Hants PO7 7XN
☎ 0705 266509

Startronics
4 Arnold Drive
Droylsden
Manchester M35 6RE
☎ 061 370 9115

Vally PD
PO Box 15
Peterlee
Co Durham SR8 1NZ
☎ 091-587 1195

Virus Free PD
31 Farringdon Road
Swindon
Wiltshire SN1 5AR
☎ 0793 512321

What do we mean, Amiga Format is going live? That the world's best-selling Amiga magazine is turning into some kind of Frankenstein's monster?

Well, no. What we mean is that we've arranged a very special event this Spring for all Amiga owners. It's going to be a computer show like no other, arranged exclusively for Amiga owners and inspired by the people who run Britain's favourite computer magazine.

What will be happening there? Well, first and foremost there will be stall after stall overflowing with great Amiga bargains - games, hardware, serious software, the lot. Just like in Amiga Format.

Naturally, because it's a live event that also means you can get advice and see products demonstrated by the people who make and sell them. Which makes life an awful lot easier.

And that's as well as taking advantage of some very special prices.

So it's a great place to go shopping, but there's a lot more besides.

Commodore, the makers of the Amiga, are giving their full backing to the event and will be there in style – they may also announce the Amiga of the future, the most exciting development since the A1200. If you're lucky.

The Amiga Format team will be there along with a host of other Amiga experts, to have a chat, answer your questions and help you out with any specific Amiga problems.

What happens w
top Amiga mag

A special Sound and Vision area will concentrate on Amiga graphics and music, and how they can be used in making your own videos.

For gamesplayers, there's the Amiga Power arcade where you can see – as well as play – all the latest top game releases. And you can experience virtual reality for yourself, too.

The venue has yet to be confirmed, though it's a prestige central London site, and much more has yet to be revealed about what new products will be launched at the show, and other special events, so keep an eye on the news pages of your favourite Amiga magazine.

But what's certain is that it's going to be quite an event. If you've got an Amiga, you really ought to be there. So make sure to get it arranged right now, and we'll see you there!

PRODUCT LOCATOR

PRODUCT LOCATOR

SOFTWARE • SOFTWARE • SOFTWARE • SOFTWARE • SOFTWARE • SOFTWARE • SOFTWARE • SOFTWARE

Welcome to the *Amiga Shopper* Buyer's Guide, your regular guide to what's hot and what's not in the Amiga market place. It's designed as a simple-to-use yet comprehensive guide which will help you to make the right buying decisions. It may not include each and every product ever produced for the Amiga (that would take up virtually the whole of *Amiga Shopper*!), but rest assured that all the major brands are here.

The Buyer's Guide will run each and every month and as new products are released and others discontinued, we'll be updating it accordingly. This month we bring you what is possibly the most comprehensive guide to software for the Amiga owner.

PAINT PROGRAMS

Product	Supplier	Price	Screen Modes	Max Colours	Overscan	Animation	Rating	Issue
MyPaint	HB Marketing	£20	L	12	No	No	***	2
The Graphics Studio	**Accolade**	**£50**	**L/M**	**32**	**No**	**No**	***	**2**
Deluxe Paint 3	Electronic Arts	£70	L/LI/M/H	64	Yes	Yes	*****	2
Deluxe Paint 4	**Electronic Arts**	**£90**	**L/LI/M/H**	**4096**	**Yes**	**Yes**	*****	**10**
Deluxe PhotoLab	Electronic Arts	£130	L/LI/M/H	4096	Yes	No	***	2
DigiPaint 3	**Silica Systems**	**£80**	**L/LI**	**4096**	**Yes**	**No**	****	**2**
Photon Paint 2	MicroIllusions	£90	L/LI	4096	Yes	Yes	*****	2
SpectraColour	**HB Marketing**	**£60**	**L/LI**	**4096**	**Yes**	**Yes**	***	**5**

L-Low Res, LI-Low Res Interlaced, M-Medium, H-High Res

ANIMATION SOFTWARE

Product	Supplier	Price	ANIM Compat	Onion Skin	X-Sheet	Sound	Rating	Issue
Disney Animation Studio	Silica	£80	Yes	Yes	Yes	Yes	****	1
Fantavision	**HB Marketing**	**£50**	**No**	**No**	**No**	**Yes**	****	**14**
MovieSetter	Silica	£80	No	No	No	Yes	****	14
Take-2	**Rombo**	**£95**	**No**	**No**	**Yes**	**Yes**	****	**14**

SOLID MODELLING/RAY TRACING

Product	Supplier	Price	Ray Tracing	24-bit	Animation	Bump Maps	Textures	Rating	Issue
Expert 4D Junior	Genisoft	£39.95	Yes	No	No	No	Yes	****	21
Real 3D 1.4	**Alternative Image**	**£120**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	*****	**4,7,20**
Imagine	Silica	£235	Yes	Yes	Yes	No	Yes	*****	4,7,20
3D professional	**Marcam**	**£260**	**Yes**	**Yes**	**Yes**	**No**	**Yes**	***	**7**
Draw 4D	Surface UK	£150	No	No	Yes	No	Yes	***	7
Sculpt 4D	**Alternative Image**	**£400**	**Yes**	**Yes**	**Yes**	**No**	**Yes**	*****	**7**
Imagine 2	Computech	£270	Yes	Yes	Yes	Yes	Yes	****	14
RayDance	**Radiance**	**£100**	**Yes**	**Yes**	**No**	**Yes**	**Yes**	***	**14**

MISC GRAPHICS

Product	Supplier	Price	Type	Rating	Issue
VistaPro	HB Marketing	£100	Fractal Landscapes	*****	7
Genesis	**MicroIllusions**	**£50**	**Fractal Landscapes**	****	**11**

IMAGE PROCESSORS

Product	Supplier	Price	24-bit	Max Colours	File Formats	Composition	Colour Control	Rating	Issue
ImageMaster	Amiga Ctr Scot.	£175	Yes	16.7m	IFF	Yes	Yes	*****	18
Art Department	**Silica**	**£100**	**Yes**	**16.7 m**	**Many**	**No**	**Yes**	****	–
Art Department Pro	Silica	£200	Yes	16.7 m	Many	Yes	Yes	*****	10
Butcher 2	**HB Marketing**	**£50**	**No**	**4096**	**IFF**	**No**	**Yes**	***	–

PAGE LAYOUT SYSTEMS

Product	Supplier	Price	Outline Fonts	Pantone	Postscript	24-bit Col	Colour Sep	Rating	Issue
PageStream 2.2	Silica	£200	Yes	No	Yes	Yes	Yes	***	2,3
ProPage 2.1	**Silica**	**£250**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	*****	**1,17**
Saxon Publisher	Surface UK	£250	Yes	No	Yes	Yes	Yes	***	17
PageSetter 2	**Silica**	**£100**	**Yes**	**No**	**No**	**No**	**No**	***	–
Shakespeare	Cloudhall	£100	No	No	Yes	No	Yes	***	–
CityDesk	**Precision**	**£130**	**No**	**No**	**Yes**	**No**	**No**	**	–
ProPage 3.0	Silica	£250	Yes	Yes	Yes	Yes	Yes	*****	17

STRUCTURED DRAWING PROGRAMS

Product	Supplier	Price	Bezier Curves	Postscript	Outline Fonts	EPS compat	Rating	Issue
ProDraw 2.1	Silica	£132	Yes	Yes	Yes	Yes	*****	–
DesignWorks	**Silica**	**£100**	**Yes**	**Yes**	**Yes**	**No**	**	–
ProDraw 3.0	Silica	£132	Yes	Yes	Yes	Yes	****	20
Expert Draw	**HB Marketing**	**£70**	**Yes**	**Yes**	**Yes**	**Yes**	***	**14**

CAD PACKAGES

Product	Supplier	Price	DXF Compat	No. Of layers	Vector Fonts	PostScript	Rating	Issue
DynaCADD	ExpressWorks	£650	Yes	256	Yes	Yes	****	3

PRODUCT LOCATOR

X-CAD 2000	Digital Multimedia	£129	Yes	255	Yes	With util included	****	–
X-CAD 3000	Digital MultiMedia	£300	Yes	255	Yes	With util included	*****	–
UltraDesign	Marcam	£200	Yes	128	Yes	Yes	***	–

WORD PROCESSORS

Product	Supplier	Price	Spell Checker	Thesaurus	Picture Import	Rating	Issue
Wordworth 2	Digita	£129.95	Yes	Yes	Yes	****	21
Mini Office 2	Europress	£69	Yes	NO	NO	****	17
Scribble!	HB Marketing	£30	Yes	No	No	***	6,9
Transwrite	HB Marketing	£40	Yes	No	No	***	6,9
Pen Pal	Harwoods	£80	Yes	No	Yes	****	6,9
Kind Words 2	HB Marketing	£50	Yes	No	Yes	**	6,9
Protext 5.5	Arnor	£150	Yes	Yes	No	*****	6,9
Wordworth	Digita	£130	Yes	Yes	Yes	****	4,6,9
Excellence 3	HB Marketing	£79.95	Yes	Yes	Yes	****	–
ProWrite 3.2	Silica	£143	Yes	Yes	Yes	***	12
Word Perfect	Sentinel	£230	Yes	Yes	No	***	–
Final Copy	Gordon Harwood	£TBA	Yes	Yes	Yes	****	15

DATABASES

Product	Supplier	Price	Type	Programmable	dBASE Compatible?	Rating	Issue
Mini Office 2	Europress	£69	Card Index	No	NO	***	17
Infofile	HB Marketing	£50	Card Index	No	No	***	9
ProData 1.2	Arnor	£100	Card Index	No	Yes	****	9
SuperBase	Precision	£30	Relational	No	Yes	****	9
SuperBase 2	Precision	£100	Relational	No	Yes	****	9,12
SuperBase Pro 4	Precision	£400	Relational	Yes	Yes	*****	4,9
Organize 2	HB Marketing	£62	Relational	No	Yes	***	–

SPREADSHEETS

Product	Supplier	Price	Lotus Compatibility	Graphs	Rating	Issue
Mini Office 2	Europress	£69	No	Yes	***	17
MaxiPlan 4	HB Marketing	£130	Yes	Yes	***	18
LP Calc	HB Marketing	£50	No	NO	*	19
Analyze!	Precision	£50	Yes	Yes	***	9
Maxiplan 500	HB Marketing	£80	Yes	Yes	***	9
ProCalc	Silica	£150	Yes	Yes	*****	–
Advantage	Silica	£100	Yes	Yes	****	1,9
K-Spread 3	Kuma	£70	Yes	Yes	***	9
K-Spread 4	Kuma	£100	Yes	Yes	****	9
DGCalc	Digita	£40	No	No	**	–
Analyze 2	HB Marketing	£50	Yes	Yes	***	–

MULTIMEDIA

Product	Supplier	Price	Interactive	External Drivers	ARexx	Rating	Issue
Presentation Master	HB Marketing	£350	Yes	No	No	****	9
HyperBook	Silica	£100	Yes	No	Yes	****	6
AmigaVision	Commodore	£80	Yes	Yes	Yes	****	–
CanDo 1.5	Checkmate Digital	£130	Yes	No	Yes	*****	–
Viva!	MicroDeal	£200	Yes	Yes	No	**	–

VIDEO TITLERS

Product	Supplier	Price	Overscan	Transitions	Amiga Fonts	Horiz Crawl	Rating	Issue
Scala MM200	Scala UK	£395	Yes	Yes	Yes	Yes	*****	21
Broadcast Titler 2	HB Marketing	£234	Yes	Yes	No	Yes	****	2
Scala 1.1	Silica	£250	Yes	Yes	Yes	No	*****	2
Scala 500	Silica	£100	Yes	Yes	Yes	No	****	–
Alternative Scroller	Alternative Image	£50	Yes	No	No	Yes	***	–
Home Titler	HB Marketing	£40	Yes	No	No	Yes	***	9
ProTitler	HB Marketing	£100	Yes	Yes	Yes	Yes	***	9
Video Caption Designer	Maze	£200	Yes	No	Yes	Yes	***	3
Video Ease	Interactive Tchnlgy	£40	Yes	Yes	Yes	Yes	**	11

DTV UTILITIES

Product	Supplier	Price	Type	Rating	Issue
AntiA	Zen	£40	Font Enhancer	****	8
BT2 Font Enhancer	HB Marketing	£130	Font Enhancer	***	8
ShowMaker	Silica	£250	Presentation System	***	10
Elan Performer 2	Silica	£180	Presentation System	****	11
Deluxe Video 3	Electronic Arts	£100	Presentation System	****	–

PRODUCT LOCATOR

MIDI SEQUENCERS

Product	Supplier	Price	No. of Tracks	Amiga Smpls	Song Arrange	Rating	Issue
Sequencer One	Gajits	£90	20	Yes	Yes	****	2
Bars&Pipes Pro	Zone	£200	Unlimited	Yes	Yes	*****	3
Pro-24	Evenlode	£300	24	No	Yes	***	4
Harmoni	HB Marketing	£50	24	Yes	No	***	7
KCS 3.5	Zone	£280	48	Yes	Yes	*****	8
Tiger Cub	Zone	£100	12	Yes	Yes	****	–
Music-X	MicroIllusions	£150	256	Yes	No	****	–
Music-X Junior	MicroIllusions	£50	256	Yes	No	****	–
Master Tracks	MCM	£200	64	No	Yes	***	–
Trax	MCM	£70	64	No	Yes	*****	–
Sequencer One Plus	Gajits	£50	32	Yes	Yes	****	16

MISC MIDI SOFTWARE

Product	Supplier	Price	Type	Rating	Issue
Dr T Boom Box	Zone	£45	Music for morons	***	21
X-Or	Zone	£220	Librarian	****	6
CMPanion	Gajits	£100	Patch Editor	****	6
Caged Artist	Zone	£100	Patch Editor	***	6
Copyist Apprentice	Zone	£100	Score Notation	****	–
Copyist DTP	Zone	£230	Pro Score Notation	****	–
Audition 4	HB Marketing	£50	Sample Editor	*****	10
AudioMaster 4	HB Marketing	£80	Sample Editor	*****	–
Audio Sculpture	SMG	£50	Sample Sequencer	**	12
Quartet	MicroDeal	£50	Sample Sequencer	***	–
Mugician	Thalamus	£30	Sample Sequencer	***	–
Music Studio	HB Marketing	£25	Sample Sequencer	**	–
TFMX	HB Marketing	£45	Sample Sequencer	***	–
OctaMED 2	AmigaNuts	£20	Sample Sequencer	*****	–
SuperJAM!	Blue Ribbon Sound.	£100	Algorithmic Composition	****	15

EDUCATIONAL SOFTWARE

Product	Supplier	Price	Type	Rating	Issue
MicroFrench	LCL	£24	Language Tutor	****	17
Learn to Read With Prof	Prisma	£25	Reading	***	2
The Three Bears	School Software	£23	Reading	***	2
Donald's Alphabet Case	Entertainments Int.	£25	Reading	***	2
Let's Spell	Softstuff	£20	Writing	****	2
Things To Do With Words	Softstuff	£20	Writing	***	2
Kids Type	GeniSoft	£25	Writing	****	2
Mickey's Zoo	Entertainments Int.	£25	Maths	***	2
Game, Set & Match	GeniSoft	£21	Maths	**	2
Magic Maths	School Software	£23	Maths	***	2
Fun School 3	Europress	£25	3 'R's	*****	2
Fun School 4	Europress	£25	3 'R's	*****	9
Puzzle Book 1	Softstuff	£20	3 'R's	****	2
Sesame Street	Merit Software	£16	Painting	***	2
Play It Safe	Deja Vu	£3.50	General	****	2
Pick A Puzzle	Deja Vu	£2.50	Jigsaw	***	2
Hooray For Henrietta	Sketlander	£25	Maths	***	2
Back To Basics	HB Marketing	£40	Maths	***	9
Maths Adventure	HB Marketing	£26	Maths	****	9
Spell!	Europress	£9	Writing	***	3
Maths Blaster Plus	Ablac Computec	£40	Maths	***	3
Maths Mania	School Software	£23	Maths	****	3
Better Spelling	School Software	£23	Writing	****	3
Answer Back Quiz	Kosmos	£20	3 'R's	****	3
Weather Watcher	GeniSoft	£25	Weather	***	4
What Is It?	GeniSoft	£20	Geography	****	4
Better Maths	School Software	£23	Maths	***	4
French Mistress	Kosmos	£20	French	****	4
Mr Robot's Speak&Spell	HB Marketing	£25	Writing	***	6
Early Learning Maths	ESP Software	£20	Maths	***	6
SpelliCopter	ESP Software	£20	Writing	****	6
Spell Book	SoftStuff	£8	Writing	****	6
Cave Maze	Coombe Valley	£12	Quiz	***	7
Maths Dragons	Coombe Valley	£12	Maths	***	7
Shapes & Colours	Rainbow	£8	Basic	****	7

PRODUCT LOCATOR

First Letters	Rainbow	£8	Reading	***	7
Reasoning With Trolls	Coombe Valley	£15	Quiz	****	8
Spellbound	Lander Software	£26	Writing	****	10
Count & Add	Lander Software	£26	Maths	****	10
Pepe's Garden	Prisma	£26	3 'R's	****	10
Picture Book	Triple 'R' Education	£20	3 'R's	*****	10
Money Matters	Triple 'R' Educational	£20	Money	*****	–
Maths Adventure	Kosmos	£26	Maths	***	12
Compendium Six	HB Marketing	£35	Six educational programs	*****	14

PROGRAMMING LANGUAGES

Product	Supplier	Price	Language	Compiler	Rating	Issue
AMOS Professional	Europress	£69.95	BASIC	Separate	*****	20
Aegis Visionary	Precision	£59	Adventure	Yes	***	17
HiSpeed Pascal	HiSoft	£100	Pascal	Yes	****	19
GFA BASIC 3.5	GFA Data Media	£50	BASIC	Separate	****	3,9
GFA Compiler	GFA Data Media	£30	Compiler	–	****	3,9
Blitz	Siren Software	£70	BASIC	Yes	***	3,9
AMOS	Europress	£50	BASIC	Separate	*****	3,9
AMOS Compiler	Europress	£30	Compiler	Yes	****	5,9
AMOS 3D	Europress	£30	BASIC Extension	–	*****	5,7
AMOS Tome	Deja Vu	£30	BASIC Extension	–	****	11
Easy AMOS	Europress	£35	BASIC	No	*****	12
HiSoft BASIC	HiSoft	£50	BASIC	Yes	****	9
RQ Forth	HB Marketing	£80	Forth	Yes	****	9
Lattice C 5	HiSoft	£230	C	Yes	*****	3,9
Aztec C	Precision	£130	C	Yes	****	9
M2 Amiga	Real Time	£125	Modula-2	Yes	****	7,9
ArgAsm	HB Marketing	£60	Assembly	–	***	9
Devpac 3	HiSoft	£70	Assembly	–	*****	10,12

UTILITIES

Product	Supplier	Price	Type	Rating	Issue
Essence	Apex Software	£80	Algorithmic textures for Imagine 2	****	20
Home Office 2	Gold Disk	£99	Integrated applications software	*****	20
Real Things	Living Data	£29.95	Animated animal brushes for DPaint	****	20
PowerWaves 3.1	Database	£17.95	Create wave-based 3D objects	****	21
Reverser	Alternative Image	£10	Animation Utility	****	17
Director 2	Alternative Image	£100	Video Presentation scripting language	***	19
Ami-Back 1.4	Omega Projects	£50	Hard Disk Backup	*****	9
QuarterBack	HB Marketing	£50	Hard Disk Backup	****	5
Personal Fonts Maker	HB Marketing	£70	Bitmap Font Editor	***	7
GB Route Plus	Complex Computers	£80	Journey Planner	*****	10
GB Route Plus Edit	Complex Computers	£30	Editor For GBRoute	****	10
Flow 3.0	Silica	£80	Ideas Processor	***	10
Turbo Print Pro	HB Marketing	£50	Enhanced Printing	****	11,12
Directory Opus	Checkmate Digital	£40	Directory Utility	*****	–
MapMaster	Alternative Image	£54	Image Mapping package	****	14
SurfaceMaster	Alternative Image	£28	Add on for Imagine	****	14
Touch Typist	Sector Software	£14	Teach yourself touch typing	****	15
SaxonScript	Surface UK	£100	Postscript interpreter	***	15
Smooth Talker	Zen Computers	£140	Video Prompting package	****	16
HotLinks	Silica	£70	Add on for PageStream 2.2	**	16
Shades	Meridian Software	£60	Gradient fills for PageStream	**	16
Hit Kit!	Gajits	£25	Sequences for Sequencer One	***	16

SUPPLIER LIST • SUPPLIER LIST • SUPPLIER LIST • SUPPLIER LIST • SUPPLIER

Ablac Computec	0626 331464	Deja Vu	0942 495261	GeniSoft	0753 686000	Meridian	0533 896743	School	010 353 61 45399
Accolade	071 738 1391	Digita	0395 270273	GFA Data Media	0734 794941	Merit	0101 214 385 2353	Software	
Alternative Image	0533 440041	Digital Multimedia	0702 206165	Harwoods	0773 836781	Software		Sentinel	0932 231164
Amiga Centre	031 557 4242	Electronic Arts	0753 549442	HB Marketing	0753 686000	MicroIllusions	0480 496497	Silica	081 309 1111
Scotland		Entertainments Int	0268 541212	HiSoft	0525 718181	Omega Projects	0925 763946	Siren Software	061 724 7572
Arnor	0733 68909	ESP Software	0702 600557	Interactive	0423 501321	Prisma Software	0244 326244	Sketlander	041 357 1659
Checkmate Digital	0707 664684	Europress	051 357 1275	Technology		Radiance	0101 408 270 7420	SMG	0274 562999
Cloudhall	0604 231211	EvenLode	0993 898484	Kosmos	0525 53942	Rainbow	0392 77369	Softstuff	0732 351234
Commodore	0628 770088	SoundWorks		Kuma	0734 844335	Real Time	081 656 7333	Surface UK	081 566 6677
Complex Computers	0706 224531	ExpressWorks	0252 726255	Lander Software	041 357 1659	Associates		Triple 'R'	0742 780370
Computech	0702 206165	Gajits Music	061 236 2515	Marcam Ltd	071 258 3454	Rombo		Software	
Coombe Valley	0626 779695	Software		MCM	081 963 0663	Productions	0506 466601	Zone	081 7666564

BUYING ADVICE FOR SHOPPERS

Whether buying over the phone or at a local store, here's our advice on how to get what you want

BUYING IN PERSON

- Where possible, always test any software and hardware in the shop before taking it home, to make sure that it works properly.
- Make sure you have all the necessary leads, manuals or other accessories you need.
- Don't forget to keep your receipt.

BUYING BY PHONE

- Be as clear as possible when stating what you want to buy. Make sure you confirm all the technical details of what you are buying. Some things to bear in mind are version numbers, memory requirements, other required hardware or software and compatibility with your particular model of Amiga (that is, make sure you know which version of Kickstart you have).
- Check the price you are asked to pay, and make sure that it's the same as the price advertised.
- Check that what you are ordering is actually in stock.
- Check when and how the article will be delivered, and that any extra charges are as stated on the advert.
- Make a note of the date and time when you order the product.

BUYING BY POST

As with buying by phone, you should clearly state exactly what it is you are buying, at what price (refer to the magazine, page and issue number where it's advertised) and give any relevant information about your system set-up where necessary. You should also make sure you keep copies of all correspondence both to and from the company concerned.

MAKING RETURNS

Whichever method you buy by, you are entitled to return a product if it fails to meet any one of the following three criteria:

- The goods must be of 'merchantable quality'.
- The goods must be 'as described'.
- The goods must be fit for the purpose for which they were sold.

If they fail to satisfy any or all of the criteria, then you are then entitled to:

- Return them for a refund.
- Receive compensation for part of the value.
- Get a replacement or free repair.

When returning anything, ensure that you have proof of purchase and that you return the item as soon as possible after receiving it. For this reason it is important that you check the hardware or software as soon as it is delivered to make sure everything you ordered is there and works as it is supposed to.

HOW TO PAY

Paying by credit card is the most sensible way, whether buying in person, by post or on the phone, because you may be able to claim the money from the credit card company even if the firm you ordered from has gone bust or refuses to help sort out your problem.

Otherwise, you should pay by crossed cheque or postal order – never send coins or notes through the mail.

GETTING REPAIRS

Always check the conditions of the guarantee, and servicing and replacement policy, so that you know what level of support to expect. Always fill in and return warranty cards as soon as possible, and make sure that you are aware of all the conditions contained in the guarantee.

BUYING PD

Even though PD software is relatively inexpensive, you should still apply the guidelines set out above, making sure that you confirm all orders as clearly as possible.

Shopping around is still important when buying PD because different houses charge different prices for the same disks. There is no set pricing structure for disks, but bear in mind that PD houses are, in theory, supposed to be non-profit making operations. AS

A CHECK LIST FOR MAIL ORDER BUYING

1 Make sure you know exactly what you want. Draw up a checklist of the specifications you are looking for and what you want it to be able to do. Check with the suppliers that their product matches your list.

2 Will the product you have in mind work with your existing set-up, and anything else you are planning to buy?

3 Can you see a demonstration? Many products are on display at computer shows around the country.

4 Are there any hidden extras? Does it need 1Mb to run, or a hard disk?

5 What technical support is provided by the supplier? Does the manufacturer offer after-sales advice? Check before you buy.

6 Check the guarantee terms. How long is the free warranty? What does it offer?

7 Draw up a list of these details and make them a condition of your order.

8 Check the price and delivery details when you order, and make a note of them.

9 Note down when you placed the order and who you spoke to.

10 When it arrives, check everything carefully. If anything is missing, don't use the product at all – contact the supplier. If it doesn't work, make the obvious checks such as the fuse. If it still doesn't work don't try to fix it – contact the supplier.

ADVERISERS INDEX

GVP GREAT VALLEY PRODUCTS

THE WORLD's Nº 1 AMIGA PERIPHERALS

PLUG-IN HARD DRIVES FROM ONLY £299

PLUG-IN HARD DRIVE AMIGA 500/500PLUS

The **A500-HD8+** provides the ultimate in hard disk performance, memory expansion and future expandability for the Amiga 500. It incorporates the same VLSI custom chip and FAAAST ROM SCSI driver which are used in GVP's Series II SCSI/RAM controllers for the A1500/2000. As a result the **A500-HD8+** offers unbeatable hard disk performance. The easy-access Autoboot/Game Switch allows the hard disk to be disabled, ensuring compatibility with the few games that will not work with a hard disk.

Every **A500-HD8+** incorporates the latest in hard disk technology with a factory installed and formatted 1" high, low power, 3½" SCSI hard disk, offering storage capacities up to 213Mb.

The **A500-HD8+** also offers the ultimate in expandability. Additional SCSI peripherals can be attached to the external SCSI port. Up to 8Mb of internal Fast RAM expansion can be installed using state-of-the-art SIMM memory modules. The unique internal Mini-Slot allows for future expansion. Every **A500-HD8+** has its own dedicated power supply, ensuring that the Amiga 500 power supply will not be overloaded and an internal fan to prevent the unit from overheating.



WHAT THE PRESS SAY...

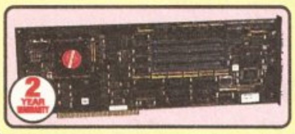
'Superb build, excellent aesthetics and blinding speed make this the best A500 hard drive' ...
AMIGA SHOPPER

'GVP claims this is the fastest hard drive in the world and none of our tests could prove that wrong ... Untouchable. THE choice'
AMIGA SHOPPER

ACCELERATORS

FOR THE AMIGA 1500/2000/4000

All GVP G-Force accelerators can be turned into a hard card by adding a Mount Kit (GVA 4251 - £34.95). Any 1" SCSI drive can then be mounted on to the accelerator.



	030 25MHz	030 40MHz	030 50MHz	040 33MHz
Processor	68030EC	68030EC	68030	68040
Speed MIPS	7.48	12.1	15	30
Speed MHz	25	40	50	33
Math co-proc	68882	68882	68882	Built-in
Standard 32-bit RAM	1Mb	4Mb	4Mb	4Mb
Maximum 32-bit RAM	13Mb	16Mb	16Mb	16Mb
Extras	SCSI	SCSI	SCSI	SCSI Ser/Par
Code	UPG 0110	UPG 0430	UPG 0533	UPG 0740
PRICE	£499	£799	£1099	£1499

HARD CARDS



FOR THE AMIGA 1500 & 2000

- *Factory installed Hard Drives*
- *0, 80, 120, 213, & 420Mb options*
- *On-board 8Mb memory sockets*
- *Add up to 6 SCSI devices*

0Mb	HAR 1300	£129
40Mb	HAR 1340	£299
80Mb	HAR 1388	£349
120Mb	HAR 1422	£429
213Mb	HAR 1533	£579

The Impact II HC8 hard cards are the equivalent of the HD8+ hard drive, but for the 1500 and 2000 models. They are some of the fastest hard drives available, and incorporate an unpopulated 8Mb RAM expansion.

PLUG-IN HARD DRIVE OPTIONS

MODEL	42Mb	80Mb	120Mb	213Mb
HD8+ HARD DRIVE	£299 INC VAT Ref: HAR 0840	£399 INC VAT Ref: HAR 0888	£499 INC VAT Ref: HAR 0922	£599 INC VAT Ref: HAR 0933

Return the coupon now for your *FREE* copy of Silica Systems

NEW GVP CATALOGUE

SOUND SAMPLER



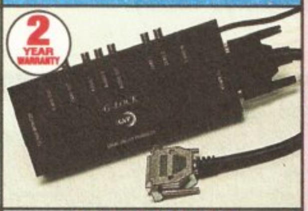
FOR ALL AMIGAS

- *8-bit stereo sampler*
- *Plugs into parallel port*
- *MIDI support for song input*
- *Extensive editing features*

For the semi-professional and audio hobbyist a high quality 8-bit stereo sound sampler that connects into the parallel port on any Amiga 500, 600, 1500, 2000 or 3000 computer. Combined with one of the fastest, most powerful and easy-to-use sound and music editing programs available. Includes 4-track soundtracker file compatible sequencer.

~~£49.95~~ **£39.95**
Ref: MUS 2500

VIDEO GENLOCK



FOR ALL AMIGAS

- *2x Composite Video, 1x S-VHS inputs*
- *RGB Composite video & S-VHS outputs available simultaneously*
- *Sound mixer, 2 mono inputs and 1 output*
- *Full software control via control panel, hotkeys and/or ARexx*

GVP's G-lock genlock is a true price/performance breakthrough. The G-lock genlock works with all Amiga computers and even supports the new Chroma Key modes of the ECS/AA chip set. It is the only choice for the mid-range Amiga video enthusiast.

Ref: VID 2500 **£349**

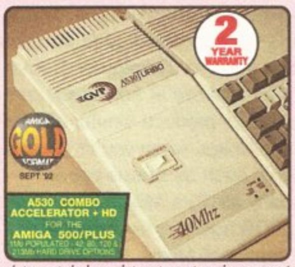
HD8+ HARD DRIVE / A530 HD & ACCELERATOR

	HD8+	A530
HARD DRIVE		
SCSI HARD DRIVE 40, 80, 120 & 213Mb VERSIONS	●	●
ULTRA FAST ACCESS	●	●
TRANSFER RATE UP TO 2,100K/sec* (*THE RATE OF THE 213Mb HD)	●	●
ACCELERATOR		
40MHz 68030EC CPU		●
OPTIONAL 68882 MATHS CO-PROCESSOR		●
RUNS AT 12.1 MIPS (FASTER THAN AN A3000!)		●
HARDWARE SUPPORT TO MAP KICKSTART INTO 32-bit WIDE FAST RAM FOR FASTER OPERATION		●
RAM BOARD		
UP TO 8MB OF 8 OR 9-bit FAST RAM (8 OR 9-bit WIDE SIMMS - 120ns OR QUICKER)	●	
UP TO 8Mb OF 32-bit WIDE FAST RAM (32-bit WIDE SIMMs - 60ns)		●
1Mb POPULATED		●
OTHER FEATURES		
'CUT-OFF' FOR 100% GAME COMPATIBILITY	●	●
SCSI CONTROLLER FOR UP TO 7 DEVICES	●	●
VLSI CUSTOM CHIP	●	●
FaaaST ROM SCSI DRIVER	●	●
IDENTICAL COLOUR & STYLING TO THE A500	●	●
BUILT-IN FAN TO PREVENT OVERHEATING	●	●
DEDICATED POWER SUPPLY	●	●
'MINI-SLOT' FOR FUTURE EXPANSIONS (E.G. PC EMULATOR)	●	●
REMOVABLE MEDIA SUPPORT	●	●
DIRECT MEMORY ACCESS (DMA) STYLE FOR ULTIMATE PERFORMANCE	●	●
EASY-TO-USE SOFTWARE	●	●
2 YEAR WARRANTY	●	●

PLUG-IN HARD DRIVE + ACCELERATOR AMIGA 500/500PLUS

The **GVP A530** incorporates the same 68030EC processor found in most of the new GVP G-Force accelerator range, as well as using the same VLSI custom chip and FAAAST ROM SCSI driver that is used in GVP's Series II SCSI/RAM controllers for the A1500/2000.

It also incorporates the Motorola 68030EC processor running at a blistering 40MHz and the latest in hard disk technology with a factory installed and formatted 1" high, low power, 3½" SCSI hard disk offering storage capacities up to 213Mb. Additional SCSI peripherals can be attached to the external SCSI port. Up to 8Mb of 32-bit wide Fast RAM expansion can be installed, using state-of-the-art SIMM memory modules (1Mb supplied as standard). A 68882 maths co-processor can also be added to the unit to boost the machine's math calculations. Every **GVP A530** has its own dedicated power supply.



"... the build quality is excellent ... in terms of performance, their gear is the best ... their equipment is worth every penny'.
94% AMIGA FORMAT 9/92

PLUG-IN HARD DRIVE & ACCELERATOR OPTIONS

MODEL	42Mb	80Mb	120Mb	213Mb
A530 COMBO HARD DRIVE & ACCELERATOR	£699 INC VAT Ref: HAR 0962	£799 INC VAT Ref: HAR 0968	£899 INC VAT Ref: HAR 0974	£999 INC VAT Ref: HAR 0983

PC EMULATOR

PLUG-IN OPTION FOR HD8+ & A530

- 16MHz 80286 processor
- 287 Maths Co-Processor socket
- 512K of PC RAM plus the use of Amiga RAM
- Supports Hercules, CGA, EGA/VGA (monochrome) and T3100 video modes
- Runs MS-DOS (3.2 and upwards) plus thousands of other PC programs



This powerful 286 emulator module simply plugs into the "mini-slot" of the GVP HD8+ or A530 (without invalidating the warranty). It has full access to the Amiga's resources and allows you to run PC and Amiga programs at the same time, giving you two computers in one.

£149
Ref: EMU 0500

ALL PRICES INCLUDE VAT - DELIVERY IS FREE OF CHARGE IN THE UK MAINLAND

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- *FREE CATALOGUES:* Will be mailed to you with offers + software and peripheral details.
- *PAYMENT:* Major credit cards, cash, cheque or monthly terms.

Before you decide when to buy your new Amiga products, we suggest you think very carefully about WHERE you buy them. Consider what it will be like a few months after you have made your purchase, when you may require additional peripherals and software, or help and advice. And, will the company you buy from contact you with details of new products? At Silica Systems, we ensure that you will have nothing to worry about. We have been established for almost 14 years and, with our unrivalled experience and expertise, we can now claim to meet our customers' requirements with an understanding which is second to none. But don't just take our word for it. Complete and return the coupon now for our latest FREE literature and begin to experience the "Silica Systems Service".

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SILICA SYSTEMS

MAIL ORDER: Order Lines Open: Mon-Sat 9.00am-6.00pm	1-4 The Mews, Hatherley Rd, Sidcup, Kent, DA14 4DX — No Late Night Opening	**Tel: 081-309 1111** Fax No: 081-308 0608
LONDON SHOP: Opening Hours: Mon-Sat 9.30am-6.00pm	52 Tottenham Court Road, London, W1P 0BA — No Late Night Opening	**Tel: 071-580 4000** Fax No: 071-323 4737
LONDON SHOP: Opening Hours: Mon-Fri 9.30am-7.00pm (Sat close 6.30pm)	Selfridges (1st Floor), Oxford Street, London, W1A 1AB — Late Night: Thursday - 8pm	**Tel: 071-629 1234** Extension: 3914
SIDCUP SHOP: Opening Hours: Mon-Sat 9.00am-5.30pm	1-4 The Mews, Hatherley Rd, Sidcup, Kent, DA14 4DX — Late Night: Friday - 7pm	**Tel: 081-302 8811** Fax No: 081-309 0017
ESSEX SHOP: Opening Hours: Mon-Fri 9.30am-5.30pm (Sat 9.00am-6.00pm)	Keddies (2nd Floor), High Street, Southend-on-Sea, Essex, SS1 1LA — No Late Night Opening	**Tel: 0702 468039** Fax No: 0702 462363

To: Silica Systems, AMSHP-0393-68, 1-4 The Mews, Hatherley Rd, Sidcup, Kent, DA14 4DX

PLEASE SEND A BROCHURE ON THE GVP RANGE

Mr/Mrs/Miss/Ms: .... Initials: .... Surname: ....

Company Name (if applicable): ....

Address: ....

....

.... Postcode: ....

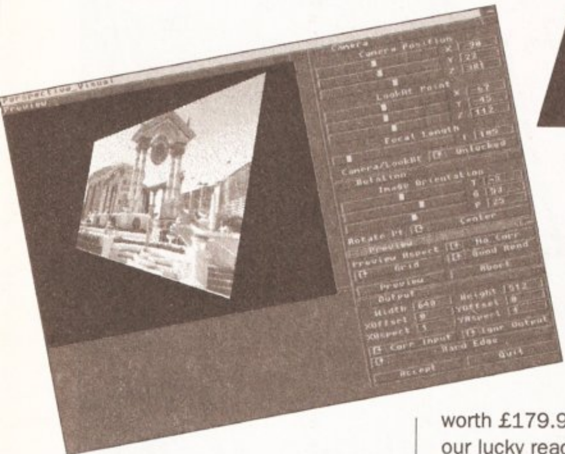
Tel (Home): .... Tel (Work): ....

Which computer(s), if any, do you own? 68J

E&OE - Advertised prices and specifications may change - Please return the coupon for the latest information.

WIN • WIN • WIN • WIN • WIN • WIN • WIN • WIN

Win four copies of Morph Plus



Get into the ever-changing world of morphing and produce animation effects you wouldn't have believed possible – with ASDG's superbly flexible Morph Plus

There can be few computer applications in recent times that have captivated the public imagination in the way that morphing has.

A morphing package enables you to stretch, warp and twist images in startling ways, as well as to create smooth transitions between two completely different images. These effects have received quite an airing in films such as *Terminator 2*. And you'd be amazed at how quick and easy it is to produce similar effects with an Amiga, when you're using a package such as States-based company ASDG's *Morph Plus*.

ASDG has very kindly donated four copies of *Morph Plus*, each worth £179.99, to give away to you, our lucky readers.

If you need convincing as to just how good this product is, then turn to page 70 and have a read of Gary Whiteley's definitive review.

Entering couldn't be easier. Choose your answers to the three remarkably easy questions in the panel on the right, jot them down on a postcard or the back of a sealed envelope, and send it off to:

Morph Fun For Me
Amiga Shopper
29 Monmouth Street
Bath BA1 2DL

Oh, and don't forget to include your name and address. The closing date for entries is March 8. Bear in mind that only one entry per household will be accepted. AS

THE CHALLENGE • THE CHALLENGE

1. What was the name of the BBC TV programme that featured a character with the unlikely name of 'Morph'?
- **a) The Nine O'Clock News**
- **b) Blue Peter**
- **c) Take Hart**

2. If you were lucky enough to own a pair of 'plus fours', what would you do with them?
- **a) Wear them**
- **b) Plug them into your thru-port**
- **c) Eat them**

3. From which ancient language is the word 'morph' derived?
- **a) Latin**
- **b) Greek**
- **c) Hebrew**

THE CHAMPION!

And the lucky winner of the January issue's *1200th Day Of Christmas* compo is (cue drum roll)... Mrs P Tuckerman of Leicester. Congratulations Mrs Tuckerman – a shiny new A1200 will be winging its way towards you real soon now.

IN NEXT MONTH'S FACT-PACKED ISSUE

- Memory – we tell you everything you need to know about Random Access Memory: whether or not you need more, what to look for when buying, and what the differences are between the various types. Naturally we have a huge review round-up of all the memory expansions you can buy.
- Professional programmer Toby Simpson solves all your programming worries in his *Code Clinic*.
- Our series on DIY repairs continues, showing you how to save money and fix those common Amiga faults yourself.

Plus: regular columns on Amiga Answers, public domain, video, AmigaDOS, desktop publishing, programming, education, music, chaos, comms and much more

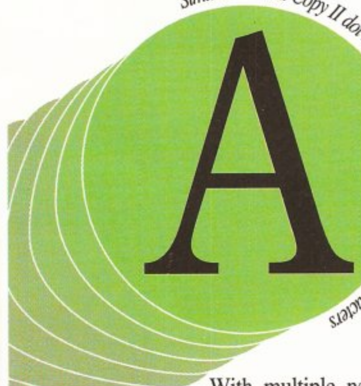
>>>> On sale Tuesday, March 2 >>>>

THE FINAL WORD

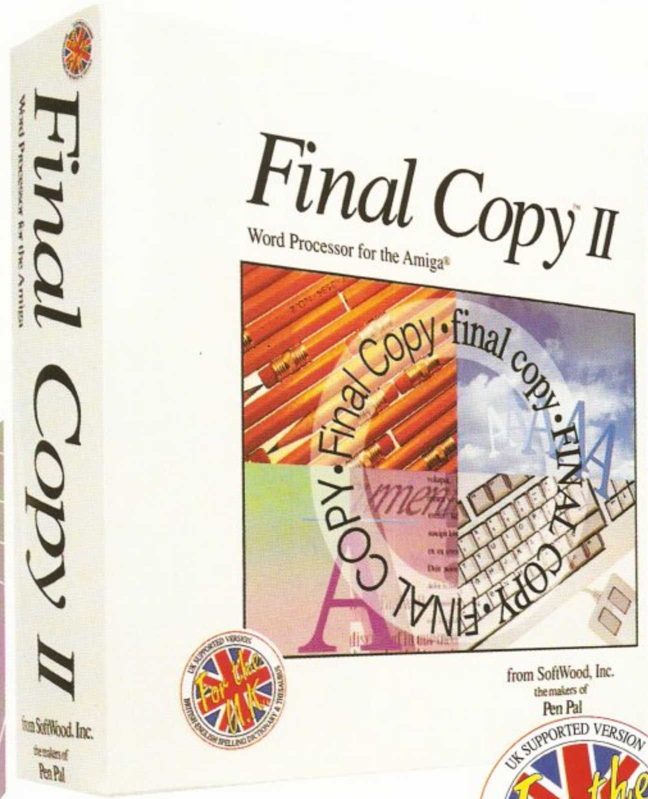
...in Word Processing with Perfect Printing

From the makers of Pen Pal comes a brand new, unique WYSIWYG Word Processing package, that's simply the only choice for those who demand the most from their Amiga.

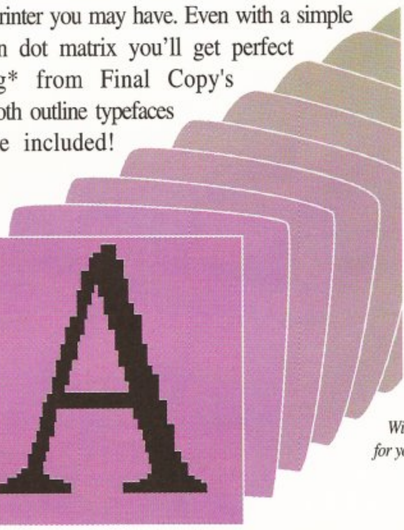
Final Copy II is not only the Amiga's most powerful Word Processor with every feature you'd expect - plus many more found normally in DTP packages - but also the only Word Processor that gives superb scaleable outline fonts from *any* Amiga - even 1.3's. Imagine outputting to your printers highest resolution, with almost Postscript™ laser perfection - no matter which printer you may have. Even with a simple nine pin dot matrix you'll get perfect printing* from Final Copy's 20 smooth outline typefaces that are included!



Simulated Final Copy II dot matrix output with smooth outline font characters



With its powerful new features, there's no better Word Processor/Publisher for your Amiga. You'll quickly realise the benefits which were once the exclusive preserve of the Macintosh™ and other high end publishing systems.



Simulated copy from a dot matrix printer with normal Word Processor

With multiple newspaper style columns and integrated drawing tools - for boxes, borders, squares, lines at any angle, ovals, circles, arrows etc., plus colour text, along with many other formatting tools - your documents will look and read just as you want them to.

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...Final Copy II

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FROM ALL GOOD SOFTWARE DEALERS

Compatible with...

Amiga-A500/600/600HD/1500/2000/3000. System requirements... min. of 1Mb. RAM and two Floppies or a Hard Disk Drive [A600HD requires at least 1.5Mb].

*Any Workbench supported graphic printer, colour or mono, including... Citizen 120D, 124D, 224, Swift 9/24, 200/240; Star LC10, 20, 200, 24-200, and XB Series; Canon BJ10ex; HP Ink/Paintjet; Postscript™ devices and many more.

Trade Distribution by...

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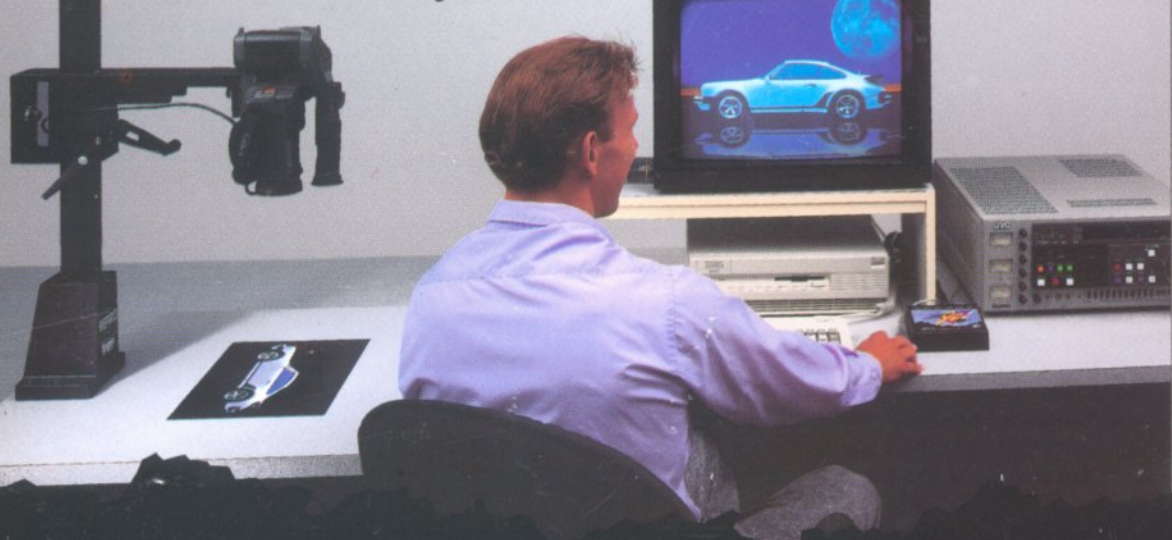
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